PROSPECTIVE COMPARATIVE STUDY OF COBLATION VERSUS CONVENTIONAL TONSILLECTOMY

Dissertation submitted to

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

in partial fulfilment of the regulations for the award of the degree of

M.S.DEGREE BRANCH -IV OTORHINOLARYNGOLOGY

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THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY

CHENNAI

DECLARATION

I solemnly declare that the Dissertation entitled **" Prospective comparative study of coblation versus conventional tonsillectomy"** was done by me at Coimbatore Medical College & Hospital during the period from September 2012 to November 2013 under the guidance and supervision of **Prof.Dr. V.Aravinthan, M.S. ENT, DNB.** This dissertation is submitted to The Tamilnadu Dr. M.G.R Medical University towards the partial fulfillment of the requirement for the award of M.S. Degree(Branch IV) in Otorhinolaryngology.

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CERTIFICATE

This is to certify that this dissertation entitled "**PROSPECTIVE COMPARATIVE STUDY OF COBLATION VERSUS CONVENTIONAL TONSILLECTOMY**" submitted by Dr. Sathish.R appearing for M.S.ENT (Branch IV) Degree Examination in April 2014 is a bonafide record of work done by her under my direct guidance and supervision in partial fulfillment of regulations of The Tamil Nadu Dr. M.G.R. Medical University, Chennai. I forward this to The Tamil Nadu Dr. M.G.R. Medical University, Chennai, Tamil Nadu, India.

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CONTENTS

INTRODUCTION

Tonsillectomy, despite less performed surgery nowadays, still is a very common surgical procedure. There are various modalities to perform surgery(diathermy, laser, cryosurgery and coblation). Among these ,dissection and snare method is commonly done by ENT surgeons .Other modalities are not used regularly considering the cost of equipment. With the arrival of coblator, results of coblation tonsillectomy has been encouraging from many studies. Unlike most operative procedures, which are closed primarily, tonsillectomy produces an open wound that heals by secondary intention.

The major postoperative morbidity problems are pain and hemorrhage [1]. The pain is the result of disruption of mucosa and glossopharyngeal nerve fiber irritation followed by inflammation and spasm of the pharyngeal muscles that leads to ischemia and protracted cycle of pain ; it does not completely subside until the muscle becomes covered with mucosa 14–21 days after surgery [2]. The postoperative secondary hemorrhage is due to secondary infection of the tonsillar fossa resulting in disruption of vessels and bleeding [3].

The various methods for tonsillectomy are dissection, guillotine, cryosurgery, monopolar and bipolar diathermy dissection, suction diathermy dissection,bipolar scissor dissection, ultrasonic removal,radiofrequency surgery and laser surgery [4].

Any improvement in these procedures should have the following advantages

i) Decrease in the operating time

ii) Reduction in the intraoperative and postoperative blood loss

iii) Reduction in postoperative morbidity

Coblation is a new technique that was started in 1997[5], and involves passing a radiofrequency bipolar electrical current through a medium of normal saline, resulting in a plasma field of highly ionized particles, which in turn break down intercellular bonds and thus melt tissue at around 70^0C (in comparison with electrocautery which cuts tissues at 400^0C).

There are two different techniques for coblation tonsillectomy: (1) Subtotal, intracapsular ablation, in this technique some tonsil tissue may be left behind; (2)Total, subcapsular dissection of tonsils, in which the entire tonsil is removed by dissecting between the tonsillar capsule and the surrounding pharyngeal muscle. In concordance with other studies [6] which state that subtotal tonsillectomy not be the best technique to use in chronic tonsillitis because tonsillar tissue is left behind and could result in recurrent infections, the subcapsular technique was adopted in this study to evaluate and compare the efficacy of coblation and conventional technique. In India this was the first study comparing both the methods in a single patient so that the individual patients factors were nullified and each patient become their own control.

AIMS AND OBJECTIVES

1. To compare the efficacy of coblation &conventional tonsillectomy in the same patient
2. To compare morbidity & complications associated with these procedures by each method in the same patient.

REVIEW OF LITERATURE

HISTORY

Celsus was first to report removal of the tonsils in1st century AD [7]. Describing his surgical technique, Celsus indicated that the tonsils are loosened by scraping around them and then torn out. Hemostasis was obtained using a vinegar mouthwash .Adtius of Amida [8] in Tigris described a technique for tonsillectomy in the first half of the sixth century, in which a hook was used to snare the tonsil and a knife was used for dissection. He warned of the severe dangers of hemorrhage when excision was too deep.

Subsequent surgical techniques were described by Paul of Aegina [9] in 625, and Physick described a forceps to facilitate extirpation of the tonsil , which became the forerunner of the modern tonsil guillotine. Mackenzie(1800) improved on the Physick tonsillotome and popularized its use for surgery of the tonsils in the late nineteenth century. Crowe and colleagues[10] reviewed 1000 consecutive tonsillectomies performed between 1911 and 1917. In the study "Relation of tonsillar and nasopharyngeal infection to general systemic disorders," they provided a detailed description of a meticulous surgical technique by sharp dissection and described using the Crowe-Davis mouth gag. The low complication rate they described compares favourably with rates in modern reports of tonsillectomy.

EMBRYOLOGY OF TONSIL

During the growth and lateral expansion of the pharynx, second pharyngeal pouch is largely absorbed in the pharyngeal wall .The dorsal remnants of second pharyngeal pouch, persist to become epithelium of palatine tonsil.

Tonsillar pillars are formed from the second and third branchial arches[11] through the dorsal extension of mesenchyme in the developing soft palate.

The actual development of palatine tonsil can be seen during the 14th gestational week when the mesenchyme underlying the mucosa of the forming tonsillar fossa is invaded by mononuclear cells.These cells are formed by lymphoblastic stem cells or pre bursa derived cells. These mesenchymal condensation are differentiated into the tonsillar lymphoid tissue.

In16th week, tonsillar primordium is seen to have an distinct organization that later shows nodular structures.which forms primary follicle after the 6th month of development .Invagination of the surface epithelium into adjacent connective tissue give rise to the tonsillar crypts and subsequently become infiltrated by thymus derived lymphocytes.As the development proceeds the tonsils enlarge and the epithelial crypts branch, degenerate and reform .This process occurs even after birth.

In 20th week the tonsillar capsule as well as the internal connective tissue of tonsil is apparently develops from the mesenchyme contiguous to the tonsillar tissue[12].

Functional germinal centers are lacking until birth and they become prevalent thereafter.

The development of lingual tonsil represents lymphoid infiltration in to the base of tongue. It occurs at the same appropriate time as close to the development of palatine tonsil. This formation may also involve epithelial in growth into the connective tissue that has already condensed in this site.

Peritonsillar mucous glands also forms and include excretory ducts around which lymphocytes [13] can be found, these ducts commonly open into saccular crypts or they may even enter the developing tonsillar lymphocytes. In 4^{th} to 6^{th} week the lymphatic tissue also forms within the posterior wall of nasopharynx to become pharyngeal tonsil or adenoid[14.]

This tissue develops modified crypts that come to represents epithelial folds and may also cover dilated ducts of subjacent mucous glands. Enlargement of this tissue has been suggested to represent tissue responsive to the rich blood supply of the nasopharynx as well as possibly bearing a local manifestation of post nasal infection.

In any event the adenoid grows rapidly in infancy and childhood and then enlarge more slowly until puberty after which a gradual decline in size occurs.

TONSIL ANATOMY

Tonsils is an oval mass of specialized subepithelial lymphoid tissue situated in the triangular tonsillar fossa[15] between the diverging palatopharyngeal and palatoglossal folds. It has 20-25 mm in length ,15-20 mm in width,12mm in thickness and1.5 gm weight. For the first 5 or 6 years of life the tonsils increase rapidly in size. They usually reach a maximum at puberty. Tonsillar involution begins at puberty, when the reactive lymphoid tissue begins to atrophy, and by old age only a little tonsillar lymphoid tissue remains.

LATERAL SURFACE

The tonsil presents a well defined fibrous capsule. Between the capsule and the bed of tonsil is the loose areolar tissue which makes it easy to dissect the tonsil in the plane during tonsillectomy. It is also the site for collection of pus in the peritonsillar abscess. Some fibres of palatoglossus and palatopharyngeus muscles are attached to the capsule of the tonsil.

Capsule has an intimate contact with deep surface of tonsil and extends into the parenchyma of tonsil which contribute connective tissue septa and conduct tonsil nerve supply and vessels.

MEDIAL SURFACE

Medial surface of the tonsil is covered by non keratinising stratified squamous epithelium which dips into the substance of tonsil in the form of crypts. Openings of 12-15 crypts can be seen on the medial surface of the tonsil. One of the crypts, situated near the upper part of tonsil is very large and deep and is called crypta magna or intratonsillar cleft .It represents the ventral part of second pharyngeal pouch. From the main crypts arise the secondary crypts, within the substance of tonsil. The medial surface of the tonsil is free and faces towards cavity of oropharynx.

In the act of swallowing, contraction of musculature in this region, particularly palato pharyngeus muscle moves the tonsil medially and turn towards buccal cavity.

POSTERIOR PILLAR

It is formed by palatopharyngeus muscle ,which orginates from palatine aponeurosis and hard palate and get insertion in soft palate.

ANTERIOR PILLAR

It is formed by palatoglossal muscle . It originates from the inferior surface of tongue and inserted within palatal aponeurosis and forms an arch with palatopharyngeus.

PLICA TRIANGULARIS

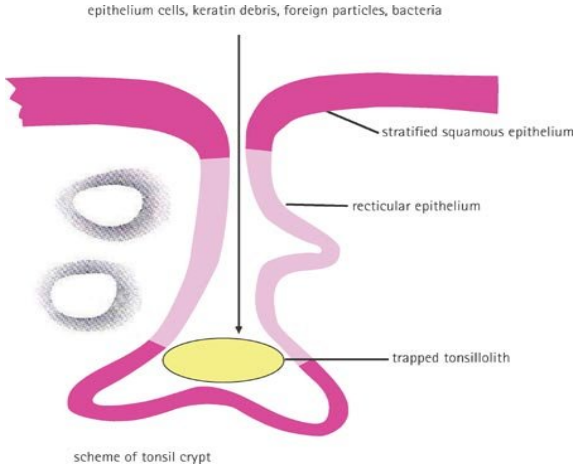
A triangular fold of mucous membrane extends from anterior pillar to the antero inferior part of tonsil and encloses a space called anterior tonsillar space. The tonsil is separated from the tongue by a sulcus called tonsillo lingual sulcus which may be the seat of carcinoma..

PLICA SEMILUNARIS

A semi lunar fold of the mucous membrane passes from the upper part of palatopharyngeal arch towards upper pole of tonsil and separates it from base of uvula the extent to which this fold is visible depends upon prominence of tonsil.

TONSILLAR CRYPTS

Figure No 1- Structure of Tonsillar Crypt



Tonsillar crypts are unique, represent tubular invagination [16] of surface epithelium within the substance of tonsil .It is irregular in shape and usually extend into the depth of tonsillar parenchyma and surrounded by lymphoid

nodules. Exfoliated epithelium as well as keratin debris and foreign particles are frequently present with crypts. Mucous glands located peripheral to tonsil also drain within tonsil crypts.

Tonsillar bed is formed by the following structures from medial to lateral

i) Loose areolar tissue containing paratonsillar vein

ii) pharyngo-basilar fascia

iii) Superior constrictor muscle

iv) Bucco-pharyngeal fascia

v) Styloglossus

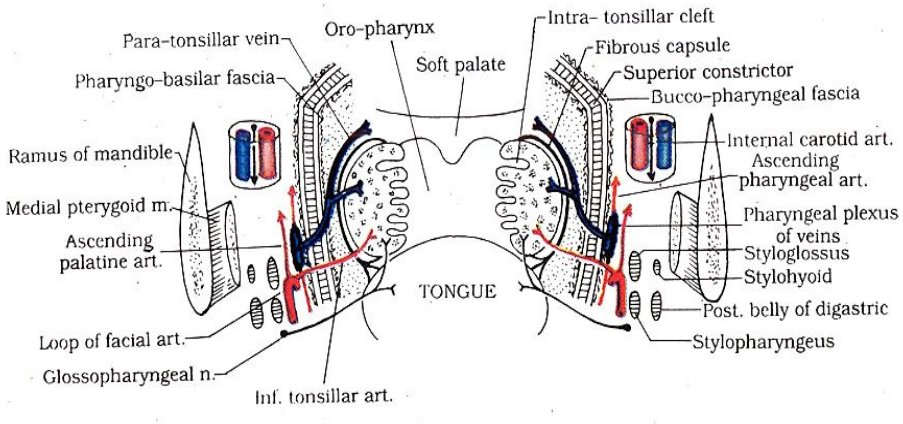
vi) Medial pterygoid muscle

vii) Glossopharyngeal nerve

viii) Facial artery

ix) Submandibular salivary gland

Figure No 2-Structures Forming Tonsillar Bed

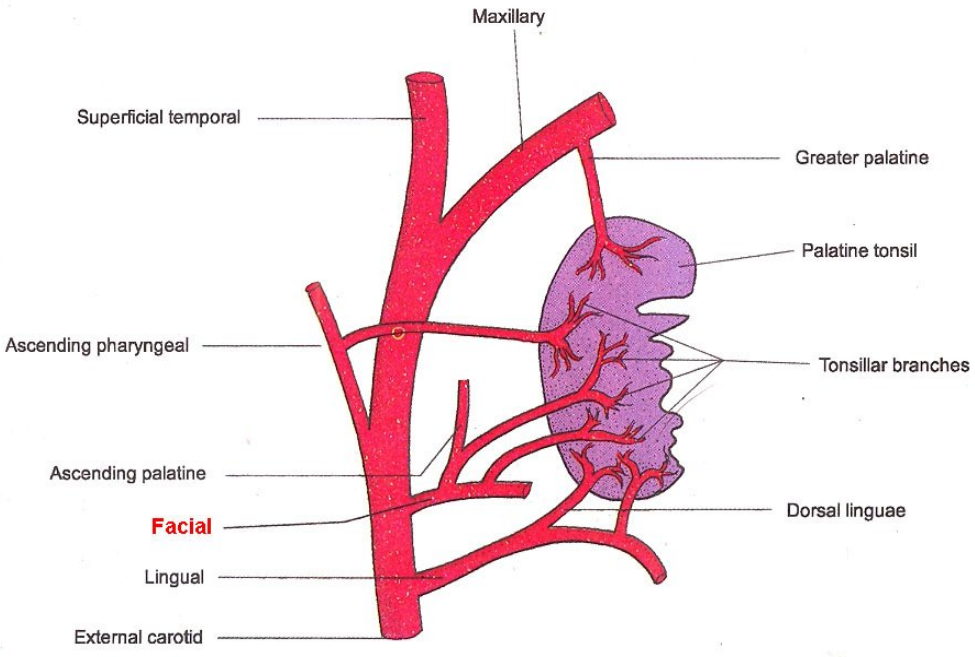


BLOOD SUPPLY

Tonsil is supplied by the main vessels from External Carotid Artery[17] and its branches

1. Tonsillar artery (from Facial Artery)
2. Ascending palatine artery (from Facial Artery)
3. Ascending pharyngeal Artery (from external carotid)
4. Descending palatine artery (from Maxillary artery)
5. Dorsalis lingual artery (from Lingual artery)

Figure No 3- Blood Supply of Tonsil



VENOUS DRAINAGE

Tonsils drain in to the paratonsillar veins and vessels pass to the pharyngeal plexus or facial vein after piercing the superior constrictor muscle. There is communication with pterygoid plexus and drains in to the common facial vein and internal jugular vein.

LYMPHATIC DRAINAGE

Unlike lymph nodes, the palatine tonsils do not possess afferent lymphatics or lymph sinuses. Instead, dense plexuses of fine lymphatic vessels surround each follicle and form efferent lymphatics which pass towards the hemicapsule, pierce the superior constrictor, and drain to the upper deep cervical lymph nodes directly (especially the jugulodigastric nodes) or indirectly through the retropharyngeal lymph nodes. The jugulodigastric nodes are typically enlarged in tonsillitis, when they project beyond the anterior border of sternocleidomastoid and are palpable superficially 1–2 cm below the angle of the mandible. When enlarged, they represent the most common swelling in the neck.

NERVE SUPPLY

The tonsillar region is innervated by tonsillar branches of the maxillary and glossopharyngeal nerves . The fibres from the maxillary nerve pass through, but do not synapse in, the pterygopalatine ganglion. They are distributed

through the lesser palatine nerves and form a plexus (the circulus tonsillaris) around the tonsil together with the tonsillar branches of the glossopharyngeal nerve. Nerve fibres from this plexus are also distributed to the soft palate and the region of the oropharyngeal isthmus. The tympanic branch of the glossopharyngeal nerve supplies the mucous membrane lining the tympanic cavity. Infection, malignancy and postoperative inflammation of the tonsil and tonsillar fossa may therefore be accompanied by pain referred to the ear.

HISTOLOGY OF TONSIL

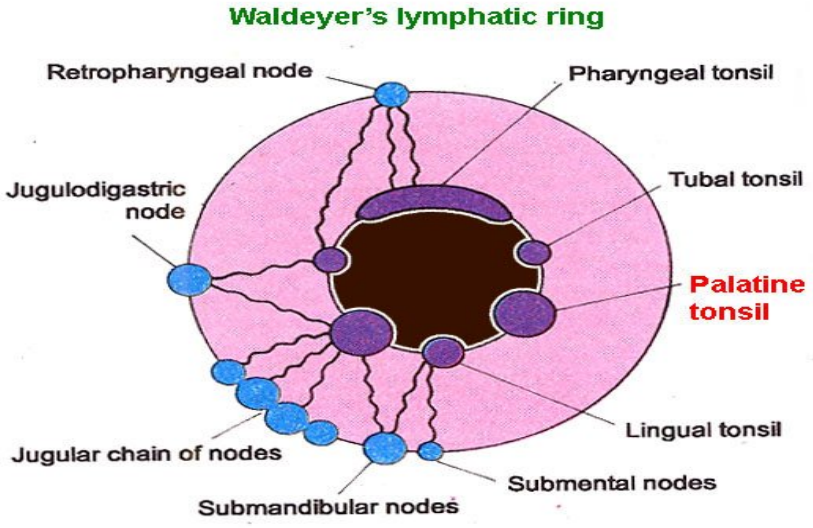
The tonsil consists of mass of lymphoid follicles in a fine connective tissue frame work. The lymphocytes are less closely packed in the centre of each nodule which is described as germinal centre because multiplication of the lymphocytes take place in this situation.

The medial surface of the tonsil facing the lumen is characterized by 15-20 openings. This openings irregularly spaced over the surface leads in to a deep narrow blind recess termed the tonsillar crypts .These may penetrate nearly the whole thickness of the tonsil and distinguish it histologically from other lymphoid organs .

The mucus membrane covering the luminal surface is non keratinizing stratified squamous type ,it also dips down to line the crypts the crypts contain desquamated epithelial debris and cells. These plugs of debris are usually cleared from the crypts

FUNCTIONS OF TONSIL

Figure .No 4 Inner and Outer Waldeyer's Ring



It is the component of inner Waldeyer's ring. It has a protective role and acts as a sentinal at the portal of air and food passage. Crypts increase the surface area for contact with foreign substances . Waldeyer's ring is a continuous band of lymphoid tissue that surrounds the upper pharynx. The superior portion of the ring is located in the nasopharynx and is composed of the adenoids. Laterally the palatine tonsils and anteriorly the lingual tonsils complete the ring[18].

The epithelium of the tonsils also varies by location . While the nasopharyngeal tonsil is covered mainly by multiple rows of ciliated epithelium, the palatine and lingual tonsils are covered by stratified, non-keratinized squamous epithelium.

The primary follicles are formed during embryonic development and differentiate into secondary follicles after birth. The secondary follicles mainly contain B lymphocytes at various stages of differentiation, along with scattered T lymphocytes [19].Tonsillar tumors or infections may result in ear pain due to referred pain conducted by cranial nerve IX. The lymphatic tissue in the tonsillar ring is also termed the mucosa-associated lymphatic tissue (MALT)[20] of the upper respiratory tract.

This function should not alter the decision to remove the tonsils if a valid indication for tonsillectomy exists. Tonsils are involved in inducing secretory immunity and regulating secretory immunoglobulin production. They contain system of channels covered by an endothelium that can mediate antigen uptake like Peyer's patches [21]of epithelium .The tonsils and adenoids are the secondary lymphatic organs. Tonsils are immunologically active between ages 4 and 10 years. Inflammation of reticular crypt epithelium results in shedding of immunologically active cells and decreasing antigen transport function with replacement by stratified squamous epithelium [22].These changes can lead to reduced activation of the local B-cell system, decreased antibody production, and overall reduction in density of B-cell and germinal centers in extrafollicular areas. [23]

GRADING OF TONSIL

Brodsky and coworkers described assessment scale for tonsillar hypertrophy.

GRADE 0 : Indicates that the tonsils do not impinge on the airway

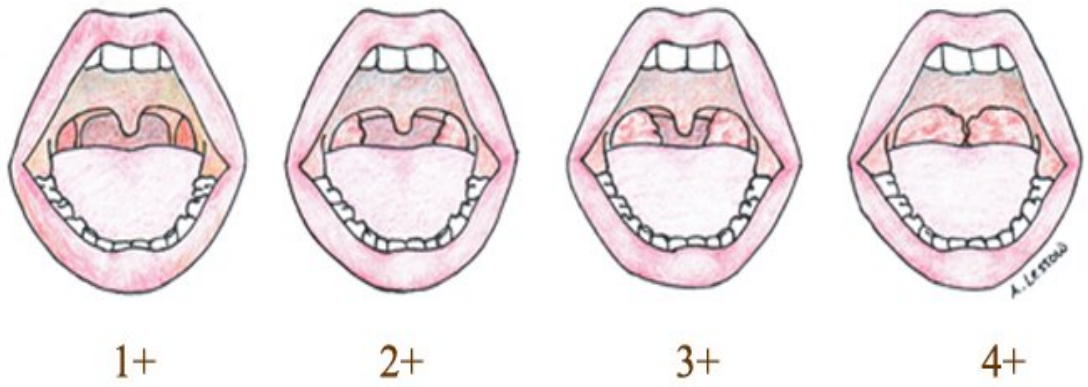
GRADE 1 : Indicates less than 25% airway obstruction;

GRADE 2 : Indicates 25% to 50% airway obstruction;

GRADE 3 : Indicates 50% to 75% airway obstruction;

GRADE 4 : Indicates more than 75% airway obstruction

Figure No 5 Grading Of Tonsil



INFLAMMATORY DISORDERS OF TONSIL

ACUTE TONSILLITIS

May occur as an isolated episode or associated with upper respiratory illness including generalized pharyngitis or part of systemic infections like infectious mononucleosis.

CAUSATIVE ORGANISM

Group A Beta Hemolytic Streptococci, Staph pneumococci, H.influenza, Influenza, HSV, RSV, coxsackie, ECHO, also anaerobes and viruses.

Acute tonsillitis affects both sexes and all age groups. It is common in children and during autumn and winter months. Clinical Evaluation was done by history of febrile illness, sore throat, painful swallowing, pharyngeal erythema with or without tonsillar exudates[24].Painful cervical adenopathy, follicular [lacunar] tonsillitis is indicated when multiple small patches seen in medial surface of tonsil.

DIAGNOSIS

Diagnosis was made by Clinical assessment, Bacteriological culture and Rapid antigen testing [RAT][25] for Group A Beta hemolytic streptococci.

Primary management was mainly supportive ,analgesics and adequate hydration.

Specific treatment in patients who shows no signs of improvement within 48-72hrs [or] in whom there is clinical concern because of severity of symptoms. Drug Of Choice is Benzyl Penicillin for 7 days. Single dose of dexamethasone [26] as adjuvant therapy decreases pain in acute pharyngo tonsillitis with no evidence of predisposition to abscess formation with the use of the steroids.

Complications were peritonsillitis followed by systemic sepsis including septicemia and septic arthritis .In case of Group A Beta Hemolytic Streptococci, scarlet fever causes exanthematous reaction.Non-infective sequalae, Rheumatic fever and glomerulo nephritis were considered under immune complex disorder.

SUBACUTE TONSILLITIS

Patients have low grade discomfort in the throat. On examination there is inflammed looking tonsils. It may be mild or severe.

CHRONIC TONSILLITIS

Patients have chronic low grade symptoms like throat discomfort and production of unpleasent smelling.On examination white or yellow debris from tonsillar crypts. Rarely debirs inspissates, calcify and form tonsillolith [27]. When complicated by acute sepsis it causes low grade ill health in children and recurrent throat pain.

DIFFERENTIAL DIAGNOSIS

DIPHTHERIA

Onset is more gradual. Cervical adenopathy [28] is prominent. Hoarseness, stridor and croupy coughing is frequent . Diphtheric membrane is formed by firm, healthy, gray tissue, firmly adherent to tonsils and pharyngeal mucosa. It is pathognomic feature for diphtheria. Attempts of removal may cause bleeding. Airway obstruction is also possible in severe cases.

Diagnosis was made by demonstration of Klebs – Loffler bacilli by Gram stain or culture.

SCARLET FEVER

Thick membrane tonsillitis with marked erythema of oropharyngeal mucosa, straw berry tongue, prominent lingual papilla and diffuse erythematous skin rash are the clinical findings. It is diagnosed by B-Hemolytic streptococci in throat culture and immune testing was done by Dicks test [29] or Shultz – Charlton blanching Phenomenon in which convalescent serum causes the skin rash to fade.

VINCENTS ANGINA [TRENCH MOUTH]

Ulcerative gingivitis, stomatitis with pharyngitis are common .Simultaneous infection of oral cavity with a spirochete and bacteriodes organism (fusobacterus fusiform) can occur invariably in presence of poor

dental and oral hygiene. Grey necrotic pseudomembrane cover tonsillar and pharyngeal mucosa and results in necrosis of surface mucosa by infecting organism. Slough or membrane from underlying tissue would produce bleeding .It is diagnosed by clinical examination, chronic oral ulceration and identification of organism by methylene blue in smears or culture.

INFECTIOUS MONO NUCLEOSIS

Acute pharyngo tonsillitis is frequent manifestation in young adults .The causative organism is Epstein Barr Virus . Clinical features are throat pain and severe systemic upset. Hematological and hepatic disturbances. Splenomegaly[30] and spleen vulnerable to abdominal trauma for a period of month after cessation of symptoms.

Diagnosis by Monospot blood test has sensitivity <50% in children and 70-90% in adults.

Confirmation was done by specific EBV antibody tests .Symptoms are serious dysphagia and occasional dehydration from poor oral intake .Secondary bacterial infections can occur upto 30%.Most commonly Beta Hemolytic streptococci. Antibiotics routinely prescribed are high dose penicillin [31] , Metronidazole [or] $2^{nd}/3^{rd}$ generation cephalosporins. Ampicillin must be avoided in this condition as patient may suffer a severe allergic reaction in consequence .If there is extreme swelling of tonsils complications such as airway compromise and severe difficulty in swallowing results. Short course of

high corticosteroids should be administered as adjunct. Steroids should not be employed routinely in view of the diseases associated with lympho proliferative disease. Steroids should be given only in combination with antibiotics for disease like Agranulocytosis, Leukoplakia, Pemphigus, Leukemias, Syphillis with punched out ulcer and Tuberculosis.

DIFFERENTIAL DIAGNOSIS OF CHRONIC TONSILLITIS

i)Tuberculosis ii)Syphilis iii)Pathogenic mycosis iv)Collagen disease v)Systemic lupus erythematous vi)Pharyngeal gummas vii)Leprosis viii)Actinomycosis ix)Blastomycosis x)Coccidiodal granulomas xi)Leishmaniasis

PERITONSILLAR ABSCESS – [QUINSY]

Collection of pus in the potential space between tonsil [32] and its bed. Prior to the formation of pus, there is frequently a period of peritonsillar cellulitis without abscess formation.

CLINICAL FEATURES

Progressive, usually unilateral, sore throat over three to four days, odynophagia, dysphagia for solids and eventually liquids, drooling of saliva, trismus, ipsilateral otalgia and headache associated with fever ,lethargy and ipsilateral lymphadenopathy.

The patient often develops a hot potato voice secondary to the oropharyngeal swelling and on examination, trismus is virtually pathognomonic, the tonsil is displaced medially by the hyperaemic, bulging mucosa of the anterior pillar over the peritonsillar space and in addition the jugulodigastric nodes are tender and enlarged. Bilateral quinsies have been reported in association with infectious mononucleosis.

Local and systemic illness can occur. If untreated result in spontaneous discharge of pus . Course of disease may be modified by i) Antibiotic therapy. ii) Needle aspiration or incision and drainage.

Causative organism are B-Hemolytic streptococci,Streptococci Viridans,Staphylococcus.aereus,H.Influenza and Anaerobes. In severe cases airway compromise can occur associated with dehydration and inability to swallow.

INVESTIGATIONS

Needle aspiration of pus is often curative and may also provide useful bacteriology in recurrent or nonresponsive quinsies and help clarify the difference between peritonsillar cellulitis and Peritonsillar abscess. Transoral ultrasound is used in some countries as an effective noninvasive method of differentiating pus from cellulitis .Dental radiographs or an orthopantomogram may be helpful in the presence of coincidental dental disease. Computed tomography (CT) has been used in the presence of suspected complications such

as spread to the parapharynx, retropharynx and mediastinum. Magnetic resonance imaging (MRI) angiography may be suitable for suspected vascular anomalies.

Formerly it is an absolute indication for interval tonsillectomy now other factors taken into account including history of frequent tonsillitis. In case of Second quinsy it is a definitive indication for tonsillectomy. Release of large amount of pus into the posterior aspect of oral cavity either spontaneous or therapeutic would result in risk of aspiration especially in severely ill patients. Use of Local Anaesthesia increases the risk. The treatment is aspiration of abscess using a wire bore needle or syringe together with antibiotic therapy with high dose iv penicillin [or] cephalosporin and metronidazole for anaerobes.

DIFFERENTIONAL DIAGNOSIS

i)INFECTIOUS: Peritonsillar cellulitis, parapharyngeal abscess, upper third molar abscess and coexistent infectious mononucleosis.

ii)INFLAMMATORY: Kawasaki disease will present as Peritonsillar abscess. Treatment is aspirin and intravenous gammaglobulin.

iii)VASCULAR: post-traumatic internal carotid artery pseudoaneurysms can occasionally cause catastrophic confusion.

iv)BENIGN LESIONS: benign lymphoepithelial cyst.

v) NEOPLASTIC: Large tonsil tumors with lateral extra tonsillar spread, such as squamous cell carcinoma (SCC) tonsillar lymphoma and rhabdomyosarcoma.

vi)PERITONSILLAR SPACE TUMOURS: minor salivary gland tumours.

vii)ANTERIOR PILLAR MUCOSAL TUMOURS: For example, squamous cell carcinoma.

COMPLICATIONS OF PERITONSILLAR ABSCESS

1.Local venous thrombosis or phlebitis. 2.Endocarditis ,nephritis and periodontitis. 3.Brain abscess. 4.Supraglottic edema may occur from extension of infection,emergency tracheostomy needed in these conditions. 5.Involvement of pharyngomaxillary space requires external drainage through submandibular space. 6.Necrotizing fasciitis.7.Perichondritis of thyroid cartilage. 8.Aspiration of blood or pus causes pneumonitis and pulmonary abscess. 9.Spontaneous hemorrhage from any carotid or jugular vessels through erosion.

RETROPHARYNGEAL ABSCESS

Retropharyngeal abscess most commonly occur in children under six years of age, with a peak incidence between three and five years, due to a suppurating retropharyngeal node following a upper respiratory tract infection. In adults and children it may occur very rarely secondary to foreign body penetration or due to spread from cervical spine TB. In young children, suggestive features in the history include neck stiffness associated with fever,

irritability, dysphagia, airway obstruction and on examination, the posterior pharyngeal wall bulges forward .

A history of previous Tuberculosis contact, pharyngeal trauma by fish or chicken bone [33], dental problems and intravenous drug abuse must be specifically sought. Pain occurs at a relatively late stage and may be associated with fever. Neurological signs may develop due to cord compression when infection tracks into lymphoid tissue between post pharyngeal wall and pre vertebral fascia.

Child systemically ill will have evidence of airway compromise or an associated neck abscess. Plain X-ray of neck ,CT, USG are required for diagnostic purpose. Initially high doses of antibiotics given and when pus formation is suspected drainage should done under General Anaesthesia with airway protected by intubation by skilled and experienced anesthetist.Abscess usually drained per orally.External drainage via neck may be appropriate in severe cases and rarely requires tracheostomy . If it is due to Tuberculosis patient requires Anti Tuberculous Treatment.

PARAPHARYNGEAL ABSCESS

The parapharyngeal space lies on either side of the superior part of the pharynx the nasopharynx and oropharynx. It is bounded laterally by the parotid gland, parotid fascia and medial pterygoid muscle.Medially it is bounded by the superior constrictor

muscles, separating it from the pharynx. Superiorly it is limited by the skull base and inferiorly by the fascia surrounding the submandibular gland. Posteriorly the space communicates with the retropharyngeal space.

The parapharyngeal space contains the carotid sheath with the internal carotid artery, internal jugular vein,vagus nerve, styloid muscles, the last four cranial nerves and some lymph nodes. Infection can spread to the parapharyngeal space from any of the other deep neck spaces like peritonsillar, retropharyngeal and submandibular spaces [34].

Clinical features are very similar to peritonsillar abscess except that the maximum swelling in the pharynx is more inferiorly placed and behind the tonsil with less oedema of the palate. In addition, there is tender, firm but fluctuant swelling of the abscess to be felt in the neck rather than lymphadenopathy.

CT scan of the neck including the head if mastoiditis is suspected and the chest if mediastinitis is suspected . However, CT scan is not necessarily specific in differentiating abscess from cellulitis or inflammatory oedema and, therefore, a decision for surgical intervention should be based mainly on the clinical status of the patient .Occasionally, plain soft tissue lateral films of the neck or CT scan may demonstrate a foreign body that has penetrated the pharynx.

Pre operative naso endoscopic assessment of the upper aero digestive tract can be helpful to assess the inferior extent of the 'pharyngeal airway

bulge'[35] in order to decide whether safe intubation is feasible or whether preoperative tracheostomy under local anaesthetic is indicated .

Broad spectrum IV antibiotics which cover streptococci and anaerobes should be given.

TONSILLOLITH

Tonsillar concretions or tonsilloliths arise from retained material and bacterial growth in the tonsillar or adenoid crypts and may exist in patients with or without a history of inflammatory disorders in either the tonsils or adenoids. The clinical presentation of fetor oris (halitosis) and sore throat as well as the presence of whitish, expressible, foul-tasting, and foul-smelling cheesy lumps from the tonsils characterizes the tonsillar concretions in many patients. Local management involves simple expression of the concretions by the patient, the use of pulsating jets of water to clean the pockets of debris mechanically or application of topical silver nitrate to the tonsillar crypts in an effort to chemically cauterize and obliterate them. Persistent problems with pain, halitosis, foreign body sensation, or otalgia may require surgical removal of the tonsils as definitive therapy.

INDICATIONS FOR TONSILLECTOMY

The American Academy of Otolaryngology–Head and Neck Surgery[36] (AAO-HNS) suggested the following clinical indications:

ABSOLUTE INDICATIONS

1.Enlarged tonsils that cause upper airway obstruction, severe dysphagia, sleep disorders, or cardiopulmonary complications.

2.Peritonsillar abscess that is unresponsive to medical management and drainage documented by surgeon, unless surgery is performed during acute stage.

3.Tonsillitis resulting in febrile convulsions

4.Tonsils requiring biopsy to define tissue pathology

RELATIVE INDICATIONS

1.Three or more tonsil infections per year despite adequate medical therapy

2.Persistent foul taste or breath due to chronic tonsillitis that is not responsive to medical therapy

3.Chronic or recurrent tonsillitis in a streptococcal carrier not responding to beta-lactamase-resistant antibiotics

4.Unilateral tonsil hypertrophy that is presumed to be neoplastic.

PITTSBURG CRITERIA

1 a) .Atleast 3 episodes of tonsillitis[37] per year for 3 years.

5 episodes of tonsillitis per year for 2 years.

7 or more episodes of tonsillitis in 1 year.

b) Each episode must have been characterised by

i) Oral temperature 38.3degree Celsius.

ii) Enlarged >2cm or tender anterior cervical lymphnode.

iii) Tonsillar exudates.

iv) Positive culture for group-A beta haemolytic streptococci

c) Apparently adequate antibiotic therapy must have been administered for proven or suspected streptococcal episodes

d) Each episode must have been confirmed by examination and it's qualified features described in a clinical record at time of occurrence

2. Peritonsillar abscess

3.Chronic tonsillitis (minimum 6 months) persisting despite appropriate anti microbial therapy

4.Non urgent obstructive symptoms if tonsils very large Stretous or mouth breathing with or without episodes of obstructive sleep apnea,muffled hot potato voice if child is atleast 6 yrs old

5.Chronic (minimum 6 months) enlargement (>2cm) or tenderness of anterior cervical lymphnodes persisting despite appropriate antibiotic therapy

OBSTRUCTION

i) Tonsillar hyperplasia with obstruction ii)Sleep-related disordered breathing iii)Obstructive sleep apnea syndrome iv)Upper airway resistance syndrome v)Obstructive hypoventilation syndrome vi)Failure to thrive vii) Cor pulmonale viii)Swallowing abnormalities ix) Speech abnormalities x) Orofacial and dental abnormalities xi)Lymphoproliferative disorder

INFECTION

i)Recurrent or chronic tonsillitis with abscessed cervical nodes ii)Acute airway obstruction iii)Cardiac valve disease iv)Persistent tonsillitis[38] with persistent sore throat v)Tender cervical nodes vi) Halitosis vii) Tonsillolithiasis.

NEOPLASIA

Suspected neoplasia, either benign or malignant

SIGN GUIDELINES

The following SIGN guidelines[39] are recommended as reasonable indications for consideration of tonsillectomy in both children and adults, based on the current level of knowledge, clinical observation in the field and the results of clinical audit. Patients should meet all of the following criteria:

• Sore throats due to tonsillitis;

• There are five or more episodes of sore throat per year;

• There are symptoms for at least a year;

• The episodes of sore throat are disabling and prevent normal functioning.

The decision to proceed with adenoidectomy at the same time is made by taking into consideration the symptoms and age of the patient. Younger patients will frequently have physiologically large adenoids, tonsillar hypertrophy and chronic tonsillitis and will have symptoms of mouth breathing and chronic rhinorrhea. These patients would benefit from adenoidectomy. Adults and

adolescents are less likely to have adenoid hypertrophy because adenoid tissue usually regresses by adolescence and does not typically require adenoidectomy. However, visualization of the nasopharynx should be performed during the procedure if there is concern about hypertrophic adenoid tissue.

AS PART OF OTHER SURGERIES

1. Palatopharyngoplasty which is done for sleep apnoea syndrome[40].

2. Glossopharyngeal neurectomy. Tonsil is removed first and then IX nerve is severed in the bed of tonsil.

3. Removal of styloid process.

4. Branchial fistula

5. Parapharyngeal tumour excision

CONTRAINDICATIONS

1. Haemoglobin level less than 10 g%.2. Acute infection in upper respiratory tract, acute tonsillitis. Bleeding is more in the presence of acute infection. 3. Children under 3 years of age. 4. Overt or submucous cleft palate. 5. Bleeding disorders [41], e.g. leukaemia, purpura, aplastic anaemia, haemophilia. 6. At the time of epidemic of polio. 7. Uncontrolled systemic disease, e.g. diabetes, cardiac disease, hypertension or asthma.8. Tonsillectomy is avoided during the period of menses.

Patients who have episodes of tonsillitis and known coagulopathies themselves or have family members with such a history represent a very significant problem and one that should be approached with great caution. Although such patients may undergo tonsillectomy uneventfully, there is a possibility of significant and prolonged bleeding at any point from the time of the procedure through healing of the fossa some weeks later. Reluctance should be the rule in scheduling these patients for tonsillectomy, and active involvement of a consultant hematologist is necessary. There have been studies indicating that preoperative assessment based on a history of bleeding and abnormal laboratory data cannot predict intraoperative bleeding.

Preoperative autogenous blood banking and the use of designated donors may assist in ensuring a satisfactory outcome. Patients with bleeding dyscrasias who come from specific religious groups that prohibit the use of blood or blood products should not undergo tonsillectomy in the community hospital setting but rather should be referred to academic institutions prepared to handle this type of medical-ethical dilemma.

DISSECTION TONSILLECTOMY

Most common method of 'cold steel' tonsillectomy is dissection technique [42]. Tonsil retracted medially, the mucosa overlying the tonsil capsule incised and plane of loose areolar tissue between the tonsil and the pharyngeal musculature dissected with steel dissectors, gauze or cotton wool until the tonsil

is fully mobilized. Blood vessels traversing the plane of dissection are dealt with either by ligature or diathermy as required. Traditional dissection remains the most frequently used method.

DIATHERMY TONSILLECTOMY

In recent years, the diathermy technique has evolved from using it as an aid to haemostasis (when the tonsil has been delivered) to dissection of the tonsil from its bed . The intraoperative blood loss was minimum [43] and it is most common alternative to traditional tonsillectomy. Major concerns are increase in secondary haemorrhage rate and increased pain .Both bipolar and monopolar equipment is used. The consensus of the majority of studies is that electrocautery dissection is associated with less operative time and intraoperative blood loss compared with sharp techniques. This technique, however, may cause increased postoperative morbidity with respect to pain and delayed return to normal diet and activity .50 to 60% of otolaryngologists nationally who completed both literature surveys as well as online surveys, perform monopolar cautery as their technique of choice for tonsillectomy.

HARMONIC SCALPEL

The harmonic scalpel has also been used for tonsillectomy. In this procedure, ultrasonic technology is used to cut and coagulate tissue [44] at temperatures lower than those associated with electrocautery and lasers. This

scalpel has been used for other techniques in otolaryngology and other fields of surgery. In contrast to electrocautery or laser dissection, cutting and coagulation occur at temperatures typically three to four times lower than the temperatures that occur in the traditional electro cautery technique. The decreased thermal damage is thought to lead to decreased postoperative pain.

There are limited studies with the harmonic scalpel. Several studies indicate decreased postoperative pain, although some studies showed an increase in the postoperative pain rate. Other studies found no difference between traditional electro cautery and the harmonic scalpel technique in terms of intra operative blood loss or postoperative hemorrhage. Use of the harmonic scalpel for tonsillectomy may be a promising technique in the future.

LASER TONSILLECTOMY

Laser has been used to minimize the intraoperative blood loss during the course of tonsillectomy. Various type of laser wavelength had been studied of their usage in tonsillectomy including argon plasma coagulation [45](APC), potassium titanyl phosphate (KTP) crystal, neodymium: Yttrium aluminium-garnet (Nd: Yag) and carbon dioxide (CO2)laser. With the advent of the laser as a surgical tool, the use of this method of dissecting out the tonsil has been advocated as having advantages in terms of reduction of bleeding, postoperative pain and more rapid healing.

The evidence would suggest that this technique cannot be recommended as an alternative to conventional tonsillectomy on the grounds of cost, morbidity and safety.

CAPSULOTOMY TECHNIQUES

A technique to ablate a part of the tonsil,leaving the capsule intact. These 'tonsillotomy' techniques include thermal tissue ablation by radiofrequency volumetric reduction (RFVR) using a customized probe and surface laser surgery [46].

They are widely used but have not been subject to good quality randomized controlled trials. They may be considered when tonsillectomy is undertaken in the very young where it may be desirable to leave some functioning lymphoid tissue.

INTRACAPSULAR TONSILLECTOMY

Power tools have recently gained favor for the performance of procedures in otolaryngology, such as sinus surgery and adenoidectomy. They have also been used for tonsillectomy. The majority of reports involve partial tonsillectomy or intracapsular tonsillectomy [47]. There have been reports of lower postoperative hemorrhage rates, as well as rapid recovery, in young children after the use of powered instruments for intracapsular tonsillectomy. This technique does not appear to be feasible for complete tonsillectomy.

PLASMA-MEDIATED ABLATION TECHNIQUE

In this ablation method, protons are energized to break molecular bonds between tissues. It is a cold method and does not cause thermal injury.

CRYOSURGICAL TECHNIQUE

Tonsil is frozen by application of cryoprobe and then allowed to thaw. Two applications, each of 3-4 minutes, are applied. Tonsillar tissue will undergo necrosis and later fall off leaving a granulating surface. Bleeding is less due to thrombosis of vessels caused by freezing [48].

-82 degrees centigrade by carbondioxide

-196 degrees centigrade by liquid nitrogen

COBLATION TONSILLECTOMY

Coblation is controlled abalation popularized in 1997 with first commercial use in arthoscopy(1992). Coblation is a unique method of rapid and controlled removal of tissue at relatively low temperatures (typically 40º-70ºC) while maintaining the integrity of surrounding tissue or structures."Coblation" is a synthetic term that means "cold "and "removal".

Using radio frequency in a bipolar mode with a conductive solution, such as saline, Coblation energizes the ions in the saline to form a small plasma field .The field created consists of high energy particles like ionized vapour layers, OH, H, Na, free radicals [49] and electron. It has enough energy to break the

tissue's molecular bonds, creating an ablative path. The plasma's energized particles have sufficient energy to break molecular bond within tissue, causing tissue to dissolve at relatively low temperatures (typically 40°C to 70°C). The result is volumetric removal of target tissue with minimal damage surrounding tissue. Depending on electrodes and power configuration it also used for hemostasis.

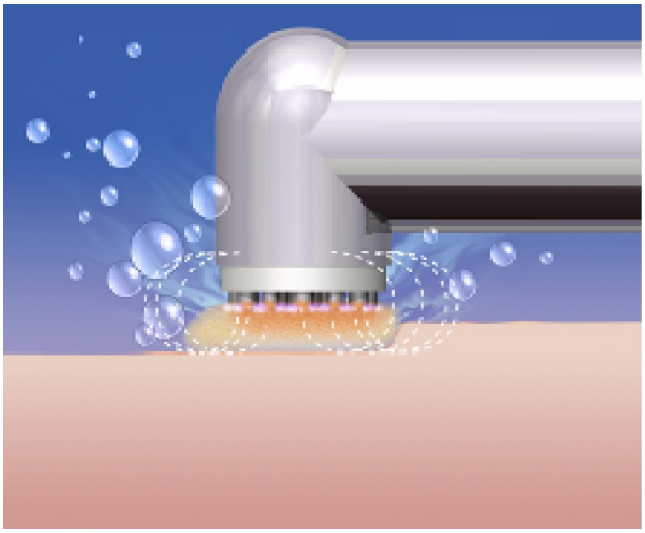


Figure No 6 – Plasma Field Created By Coblation

Plasma produces powerful tissue removal, lesser tissue temperature (40-70 degree celcius) and shallow depth of injury 50-150 micro meter [50] whereas in electro cautery it is 1.5mm depth. Good hemostasis is attained by abalation . The probes or 'wands' are of single use .The operation was performed in the standard way using the Arthro Care 2 assisted Evac-70 coblator wand .It has i) low frequency ii)Decreased tissue penetration ii)Minimal collateral tissue damage iii)Surface temperatures 40° to 70° C iv)Shorter current path v)Controlled energy delivery vi)Volumetric tissue removal

	Coblation	Electrosurgery
Mechanism of action	Molecular Dissociation & controlled tissue dissection via ionized plasma field	Cellular rupture via electricity arcing into tissue
Temperatures	40°C to 70°C	400°C to 600°C
Thermal penetration	Minimal	Deep
Effects on target tissue	Gentle removal, dissolution	Rapid heating, charring, burning, cutting
Effects on surrounding tissue	Minimal dissolution	Inadvertent charring or burning

Postoperative bleed rates were high in initial studies. Some of these bleeds may reflect lack of familiarity with the technique; some studies have reported bleed rates that are comparable with cold-steel dissection. It is suggested that postoperative pain is less than with conventional dissection but one study has cast doubt on this and shown that morbidity was less with cold steel dissection.

There are good controlled studies comparing coblation with cold steel dissection without the addition of diathermy; current evidence is inadequate to justify its introduction in preference to cold steel dissection with ties and/or packs. The National Institute for Health and Clinical Excellence (NICE) advise that current evidence is sufficient to support the use of electrosurgery

(diathermy and coblation) for tonsillectomy,but advise surgeons to ensure that they are appropriately trained and to make patients and parents aware .

RADIO FREQUENCY ABALATION

The radiofrequency technique, which is somewhat similar to the coblation technique, has also been listed in the literature as a method for performing tonsillectomy. There is also mention of using the radiofrequency technique to perform partial tonsillar ablation or tonsil reduction in children with tonsil hypertrophy[51].

The temperature-controlled radiofrequency technique operates by heating the target tissue through an electrode placed submucosally. The radiofrequency generator regulates energy flow to form a precise lesion. This lesion is then gradually reabsorbed by the body, thus shrinking tissue volume while leaving the overlying mucous membrane intact. An electrode is available for tonsil reduction. There is an apparent decrease in postoperative morbidity when compared with the traditional tonsillectomy technique in patients undergoing tonsillotomy or ablation rather than complete removal.

ANESTHESIA AND POSITION

ANESTHESIA

- Usually done under general anaesthesia with endotracheal intubation [52].

ROSE'S POSITION

Patient lies supine with head extended by placing a pillow under the shoulders. In this position both the head and neck are extended.Regardless of the technique used, positioning of the patient is critical. A rolled-up towel or blanket under the shoulders is necessary in most young patients because of the relatively large size of their head in comparison to the anterior-to-posterior diameter of their chest [53].

Care must be taken during positioning to ensure that the head is not "hanging" to avoid ligamentous injury to the cervical spine and postoperative neck pain. Patients with Down syndrome may need to be evaluated initially with cervical spine films (extension and flexion) to check for C1-C2 subluxation [54]. Hyperextension of the neck should be avoided at all times, and if possible, procedures on these patients should be performed in a neutral, nonextended manner. Patients with Down syndrome may have unusual laxity of their cervical ligamentous structure, and a shoulder roll should not be used to preclude the risk of subluxation of the cervical spine.

A Crowe-Davis or McIvor mouth gag [55] with a ring blade is gently placed into the patient's mouth with the endotracheal tube securely fixed between the tongue and blade anteriorly and in the midline . The ring blade has the safety feature of a midline groove to accommodate the endotracheal tube. Occasionally, the most difficult portion of the procedure is proper insertion of the mouth gag. The mouth gag should be placed so that the tongue is in the

midline position directly behind it. Occasionally, with a large tongue or with a narrow oropharynx or mandibular angle, the mouth gag may need to be repositioned after the procedure is performed on one side. Blades for the mouth gag come in several sizes. Children as well as some adults (women typically) accommodate a no. 3 blade, whereas men are more likely to require a no. 4 blade.

Before beginning the procedure, the surgeon must palpate the tonsils, tonsillar fossa, and hard and soft palate. Defects in the soft palate suggest the possibility of a submucous cleft palate and raise the issue of postoperative velopharyngeal insufficiency, especially if adenoidectomy is being contemplated as part of the procedure. Typically, the adenoidectomy is performed before the tonsillectomy. In this case, red rubber catheters are used to retract the soft palate, and a mirror is used to visualize the nasopharynx. Placement of an adenoid or nasopharyngeal pack after the adenoidectomy allows time for bleeding in the adenoid bed to abate during performance of the tonsillectomy. As with tonsillectomy, there have been novel procedures proposed for adenoidectomy.

When the mouth gag is slid into position and displaced inferiorly, care should be taken that the tip of the blade does not traumatize the palate, pharynx, lip, or superior portion of the tonsil, which may result in excessive bleeding. If this occurs and bleeding obstructs the field of view, cautery may need to be performed before beginning the procedure. Once the blade is in position and the

endotracheal tube and tongue are centered, the rubber portion of the curved wire is hooked on the lateral incisors or canines of the upper teeth. This should be performed under direct visualization to preclude injury to any loose teeth or to the oropharyngeal mucosa. Such injury is especially a problem in children who are transitioning to adult teeth.

Once the mouth gag is opened, careful examination should reveal that the tube is adequately protected, the upper lip is not entrapped, most of the tongue base is covered by the blade, and the tonsils are visible from the superior to the inferior pole. If there is excessive tongue base herniating into the oral cavity, the blade on the mouth gag is too small. If the tongue is so large that it prolapses around the blade, it may become necessary to position the blade for removal of the first tonsil and then reposition it for removal of the second tonsil.

With the head extended, the mouth gag is elevated and connected to the Mayo stand on which the instruments to perform the tonsillectomy are placed. Complications may occur from placement of the mouth gag, of which the surgeon should be cognizant. Such complications include dislodgement of teeth, dislocation of the temporo mandibular joint, kinking of the endotracheal tube, or accidental dislodgement of the endotracheal tube resulting in premature extubation. Small children require an uncuffed tracheal tube, and it is essential that moist radiopaque gauze be placed in the hypopharynx to prevent escape of oxygen and anesthetic agent from the endotracheal tube during the procedure.

STEPS OF OPERATION (DISSECTION AND SNARE METHOD)

An incision in anterior pillar just lateral to the mucosal reflection [56] of tonsillar surface. This incision is facilitated by grasping the tonsil with Dennis Brown tonsil holding forceps and retracting it medially and slightly inferiorly to place the mucosa of the anterior pillar under tension The anterior pillar should be preserved.

Examination of the superior pole of the tonsil and the adjacent soft palate during medial retraction of the tonsil will reveal the extent of the superior pole above the mucosal reflection before the incision. Once the capsule of the superior pole has been identified, the tonsil is retracted inferiorly for identification of the correct plane of dissection. If the dissection is performed in a meticulous manner, vessels can frequently be identified as they enter the tonsil capsule and can be controlled with electrocautery before being transected. As the tonsil is dissected inferiorly and freed from the surrounding muscular attachments, the remaining mucosa of the anterior and posterior pillars must be incised.

Postoperative discomfort and deformity can minimized by keeping the line of the mucosal incision adjacent to the tonsil [57], thereby preserving as much mucosa as possible. When the inferior pole of the tonsil has been reached, the tonsil is crushed by snare.

At the completion of the procedure, the pharynx is irrigated with saline solution. The mouth gag should be closed and opened once or twice to ensure

that bleeding is not being controlled merely by mouth gag compression. If no bleeding is evident, the pharynx is suctioned and the patient is returned to the anesthesia staff for awakening and extubation.

If at any time during this period there appears to be evidence of bleeding, the surgeon should immediately examine the pharynx and control the bleeding. If bleeding occurs before extubation, the patient should be reanesthetized and the bleeding controlled before extubation. If bleeding occurs after extubation, rapid clinical judgment is necessary to determine whether reintubation is warranted.

The most critical part of the surgical procedure may be awakening from anesthesia. Difficult emergence from anesthesia and extubation with coughing and "bucking[58]," wild thrashing of the head and thorax, or laryngospam triggered by blood and secretions on the vocal cords can result in immediate postoperative bleeding and, occasionally, airway catastrophe. It is of vital importance that the surgeon understand airway dynamics and be in the operating suite when the patient is emerging from the anesthesia during the extubation process.

It is critical that the operating room team not remove electrocautery devices or the suction tubing before the patient exits the operating room in case of postoperative hemorrhage or complications during the wakening period.

Intervention frequently requires the ability to rapidly examine the hypopharynx and remove blood clots. This may be crucial to ensuring an

uneventful emergence from general anesthesia. tonsil has been removed, it should be properly labeled regarding right and left before sending the specimen to pathology.

This is especially applicable if there is concern regarding squamous cell carcinoma or lymphoma. Appropriate patient information should be sent with the pathology request form so that the pathologist can perform either careful entire sections or routine sections (that may miss a small foci of carcinoma).Knowledge of the specific institutional policy[59] regarding histologic examination, the specific complaints of the patient, and the need for microscopic examination will dictate the appropriate comments on the pathology request form.

If the tonsillectomy is performed as part of a diagnostic evaluation for an unknown primary cancer, the entire tonsil must be sectioned because the cancer may be microscopic. In these cases, discussion with the pathologist is the best way to avoid inappropriate handling of the specimen. If lymphoma is suspected, the tissue must be handled very gently to avoid distortion of the architecture of the tonsil.

To achieve hemostasis with suction electrocautery, the area of bleeding is initially suctioned and the tip of the suction electrocautery is positioned for several seconds on this bleeding site. Occasionally there is profuse bleeding. The suction portion of the suction cautery may be used, as well as a pediatric Yankauer suction. With the two suction devices at hand, the bleeding source is

often more readily identified. Despite this technique, if bleeding continues with an unidentifiable focus point, a tonsil sponge may be placed for several minutes to further control the bleeding and identify the site that requires attention.

Alternatively, the bleeding vessel may be grasped with the tonsil hemostat and retracted medially. The hemostat may then be touched with the electrocautery by the assistant. During this procedure, however, care should be taken to ensure that other portions of the hemostat are not in contact with the tongue, gingiva, or lips. Hemostasis may also be achieved with sutures and ties. Although these techniques are occasionally difficult to perform, they are useful to control diffuse areas of bleeding.

Suturing is usually performed with non absorbable material and a tapered needle. Care must be taken to not pass the needle too deeply into the fossa because large vessels may be encountered and punctured, thereby further exacerbating.

POST OPERATIVE CARE

Immediately following tonsillar surgery under GA, patient should be taken to a properly supervised recovery room and placed on the side in Modified Trendlenburgs position [60] which allows easy removal of secretions from mouth and pharynx .Care must be taken not to injure tonsillar fossa with any suction apparatus.

Use of blunt Yankauers aspirator is best since standard rubber or plastic suction tubes can traumatize throat & start post OP hemorrhage .Once the patient is alert oral fluid started. Oral hygiene ensured with diluted saline or peroxidase solution gargle. Mild analgesics and sedation used.

The use of steroids has recently become popular. The most commonly used perioperative steroid is dexamethasone, which apparently decreases nausea and vomiting and leads to improved pain control. However,there are reports of both measured benefit and lack of improvement after the administration of steroids. It appears that in the early postoperative period, children who receive dexamethasone seem to have less morbidity secondary to an antiemetic effect. After 24 hours, however, there does not appear to be any measurable differences, so a single perioperative dose may be warranted.

In immediate post operative period, patients must rest as much as possible and liquids should be encouraged to prevent dehydration. Most patients return home the next day .Normal activities return in 2 weeks period .Medical follow up 1 week after surgery and after 1 month interval is advised. Diet prohibitions during post op period include those foods with significant roughage that might injure pharynx & cause bleeding .

Smoking prohibited as it causes inflammation & prolonged healing. Within 24 hrs of surgery, surgical wounds are covered with slough. Peripheral mucosa then gradually covers wound and healing is visually completed within 3 weeks of surgery [61]

Occasionally membrane lining the raw pharyngeal surfaces may separate by the end of 1st post op week to produce some temporary bleeding which can be controlled by supportive measures although occasional surgical intervention may be required.

COMPLICATIONS

1. ANAESTHETIC COMPLICATIONS

Most serious is respiratory or cardiac arrest. Cardio respiratory arrest due to excessive sedation from either inappropriate pre op medications or operative anesthesia given without adequate ventilation .Respiratory compromise can also result from pharyngeal obstruction by the posterior portion of tongue as well as inadequate control of secretion Endotracheal intubation can cause i)Laryngeal trauma ii)Laryngeal spasm iii)Laryngeal edema iv)Insufficient anesthesia v)Inadequate control of airway .

In Local anesthesia allergic/idiosyncratic reactions can occur. Inadvertent injections of solutions into major deep vessels in tonsillar fossa cause anaphylaxis & cardiac arrest.

2. BLEEDING

Most common serious complication is bleeding. It can occur intra op, immediate post op or delayed . Intra op hemorrhage is due to underlying coagulopathy or damage to major arteries. Methods used to control bleeding are pressure packing the fossa, cauterization of bleeding vessels or ligating the

bleeding points .If bleeding is not controlled by above methods , a bio-compatible pack like gelfoam is placed in tonsillar fossa and the tonsillar pillars oversutured to provide constant contraction. In case of severe bleeding , ligation of large arteries through an open neck exploration may be needed. Persistent hemorrhage can be from remnant tissue which is completely removed to achieve hemostasis .

Delayed post op bleeding is between 5^{th} and 7^{th} post op days . Small surface vessels that somehow have reopened produces clot that prevents normal vessel retraction and subsequent healing. Initial management[62] is evacuation of clot to control bleeding and topical medication like caustic or astringent solution may suffice.

If bleeding not controlled by above methods, fixation ligature or electro coagulation is used.If direct control of bleeding fails, emergency ligation of External carotid artery & its branching vessels may be needed. If recurrent bleeding occurs without a cause being defined ,selective angiography done for identification of vessels & proper placement of ligature.

3. INFECTIONS

Localized subacute inflammation of pharyngeal wall or tonsillar fossa respond to topical therapies as diluted peroxide or saline lavage.Significant infections particulary in dehydrated patients require antibiotics for control after culture and sensitivity .Also pharyngitis ,suppurative otitis externa & atelectasis

can occur.In patients with cardiac valvular or septal disease ,distant site of infection like heart brain or major vessels may be involved.

4. POST OPERATIVE PAIN

It was an important complication due to delayed healing and exposure of the glossopharyngeal nerve fibres in tonsillar fossa. [63] The post operative pain was measured by visual analog scale.The median time for cessation of pain was 11 (3-24) days with median duration of analgesia taken of 12 (5-25) days. The median time for cessation of pain on drinking was seven days (1 -18) and for eating and return to normal daily activities is 12 (2-24) days .

5. INJURY TO ADJACENT STRUCTURES like tonsillar pillars,uvula,pharyngeal wall tongue base, soft palate,tooth,lips and gingiva

6. INTERNAL CAROTID ARTERY THROMBOSIS

7. ECTOPIC SALIVATION can occur as a result of tissue necrosis redirecting of salivary ducts in tonsillar fossa produce ectopic salivation.

8. DENTAL INJURY

9. NASOPHARYNGEAL STENOSIS

Is an extremely difficult management problem that requires surgical intervention for satisfactory resolution. This situation may arise from excessive cauterization with extensive mucosal destruction involving the nasopharynx, lateral nasopharyngeal wall, and superior tonsillar pillar along with excessive resection of posterior tonsillar pillar tissue.

10. POST OPERATIVE FEVER

Postoperative fever is a common problem after tonsillectomy;4 percent of patients having a temperature higher than 37.5°C and 30 percent higher than 38°C in the first 24 hours post-tonsillectomy.However there is no association between colony count,core cultures, blood cultures and fever suggesting that fever is not caused by infection and therefore does not routinely require antibiotics.

11. EUSTACHIAN TUBE INJURY

12. MENINGITIS

13. LINGUAL NERVE PALSY

14. CAUTERY BURNS

15. INTERNAL CAROTID ARTERY INJURY : After deep cautery & suturing or dissection because artery lies within 5-30mm of lateral tonsillar fossa

16. DEHYDRATION :-Managed with Normal saline to prevent hyponatremia

17. POST OPERATIVE PULMONARY EDEMA

Postoperative pulmonary edema may arise in patients with long-term upper airway obstruction related to adenotonsillar hypertrophy [64], often necessitating prolonged mechanical ventilation. Patients with a prolonged history of obstructive sleep apnea as documented by polysomnography and evidence of cor pulmonale should be observed closely after surgery with pulse oximetry in a monitored setting. Patients with persistent hypercapnia may

require planned postoperative mechanical ventilation until Pco_2 values return to normal.

18.ATLANTO AXIAL SUBLUXATION

A rare complication of adenoidectomy or tonsillectomy is atlantoaxial subluxation (Grisel's syndrome). Grisel's syndrome causes persistent torticollis 1-2 weeks after surgery .Although up to 10% of patients may report neck pain after adenoidectomy, patients with Grisel's syndrome have decalcification of the anterior arch of the atlas and laxity of the anterior transverse ligament between the atlas and axis.This leads to complaints of stiff neck with spasm of the sternocleidomastoid or deep cervical muscle. The patient holds the head to one side with slight rotation toward the opposite side. Radiographic evaluation in suspected cases should include anteroposterior and lateral cervical spine radiography in addition to flexion-extension radiographs, which may detect mild subluxation.

19. REGROWTH OF TONSILLAR TISSUE

Regrowth of tonsil may require revision surgery.

20. HYPER NASALITY

Velopharyngeal insufficiency (VPI), or hypernasality, is a relatively unusual complication primarily related to adenoidectomy. In patients with excessively large tonsils and preoperative VPI, the velopharyngeal insufficiency may actually improve after the obstructive tonsils have been removed. Patients in whom postoperative VPI develops should be evaluated and managed initially

by a speech pathologist. Most cases are transient and will resolve with time. However, severe cases may require surgical intervention, such as formation of a pharyngeal flap, sphincteroplasty or posterior pharyngeal wall augmention.

21.DEPRESSION

Depression is considered in children with persistent post op character change beyond typical recovery time .

MATERIALS & METHODS

This study titled prospective comparative study of coblation versus conventional tonsillectomy was done in the Department of Otorhinolaryngology, Coimbatore Medical College Hospital from September 2012 to November 2013. Chronic tonsillitis patients who had been identified as candidates for tonsillectomy were taken up for study and randomly selected . Pre operative evaluation done using X-ray nasopharynx, diagnostic nasal endoscopy, impedence audiogram to exclude patients with associated adenoid hypertrophy and secretory otitis media .

INCLUSION CRITERIA

Chronic tonsillitis patients above the age of 3 years

EXCLUSION CRITERIA

1.Asymmetrical and unilateral enlarged tonsil

2.Children with chronic tonsillitis patients below the age of 3 years

3.Patients who needed Adenoidectomy , Myringotomy and Grommet insertion.

METHODS

DETAILED HISTORY AND EXAMINATION OF PATIENTS

All patients included in study were subjected to detailed history taking and examination pertaining to ear, nose and throat

PRE OPERATIVE EVALUATION

All patients included in study were examined and investigated by the following methods .

1.Clinical examination

2.Pure tone audiometry(in selective cases for exclusion criteria)

3.Impedence audiometry (in selective cases for exclusion criteria)

4.X Ray skull soft tissue lateral view (in selective cases for exclusion criteria)

5.Diagnostic nasal endoscopy (in selective cases for exclusion criteria)

6.Routine blood investigation(complete blood count,renal function tests)

7.Chest X-Ray,ECG

All patients who were planned for tonsillectomy were assessed for general anaesthesia.

After complete work up , patients were randomly selected to have one tonsil removed using coblation and the other using conventional dissection method. Through this study, half of the patients had their right tonsil removed with coblation and left tonsil by dissection. The other half of the patients had the left tonsil removed with coblation and right tonsil by dissection.

PROCEDURE

Under general anaesthesia using orotracheal intubation, patient put in Rose position. After painting and sterile draping Boyle Davis mouth gag with tongue blade introduced. Tonsil was retracted medially and held by using

Dennis Brown tonsil holding forceps. An incision made in the mucosal reflection site and the medial margin of anterior pillar. Plica semilunaris at the upper pole released. Posterior pillar mucosal reflection released with curved scissors .Tonsil dissected from its bed using Mollison dissector upto inferior pole and inferior pole snared. Tonsillar fossa packed. After securing hemostasis pack removed and the other side tonsil removed using coblation in the same patient. Patients were blinded with regards to the technique used to remove each tonsil. Thus, patients became their own controls in terms of postoperative pain, wound healing, and bleeding. Coblation surgeries was done by Evac 70 coblation wands using 6 or 7 setting. All surgeries were done by senior faculty of our department Prof.Dr.V.Aravinthan MS(ENT) and Dr.V.Saravanan MS (ENT). Time needed to perform surgery on each side, blood loss during surgery, post operative pain, postoperative hemorrhage and extent of wound healing after surgery were recorded. Time taken from incision to attaining hemostasis was taken as duration of surgery. Intraoperative blood loss was measured by using separate collecting chambers for each method. In coblation method blood loss was calculated after deducting the amount of saline used from total collection.

Postoperative pain was assessed on first,second and seventh postoperative day. The pain was assessed using visual analog scale (VAS) [65] (0-10) which consists of a line, usually 10 cm long. The ends are labeled as the extremes ('no pain' and 'pain as bad as it could be') and the rest of the line is

blank. The patient is asked to put a mark on the line indicating their pain intensity. The distance between that mark and the origin is measured to obtain the patient's score. Patients were enquired about the side of maximum pain during the first, second and seventh postoperative day. Even if the difference was very small, the patients were asked to choose the less painful side. The area of slough in each tonsillar fossa was assessed by direct visual examination. The extent of healing within the tonsillar fossa is estimated by recording the percentage of the fossa that had remucosalized. The episodes of postoperative bleeding from the tonsillar fossa were documented including the side and day on which it occurred and the interventions required to stop it.

OBSERVATION AND RESULTS

This study comprising of 50 patients was conducted in the Department of Otorhinolaryngology, Coimbatore Medical College Hospital from September 2012 to November 2013. Chronic tonsillitis patients with adenoid hypertrophy and serous otitis media were excluded by diagnostic nasal endoscopy, imaging and impedence audiogram .Chronic tonsillitis patients identified as candidates for tonsillectomy were selected randomly and one tonsil was removed using coblation and the other by conventional dissection method. In this study, half of the patients had their right tonsil removed with coblation and left tonsil by dissection method. The other half of the patients had the left tonsil removed with coblation and right tonsil by dissection .All patients were examined regularly after surgery on first, second and seventh post operative days to assess the post operative morbidity and efficacy of both conventional and coblation methods.

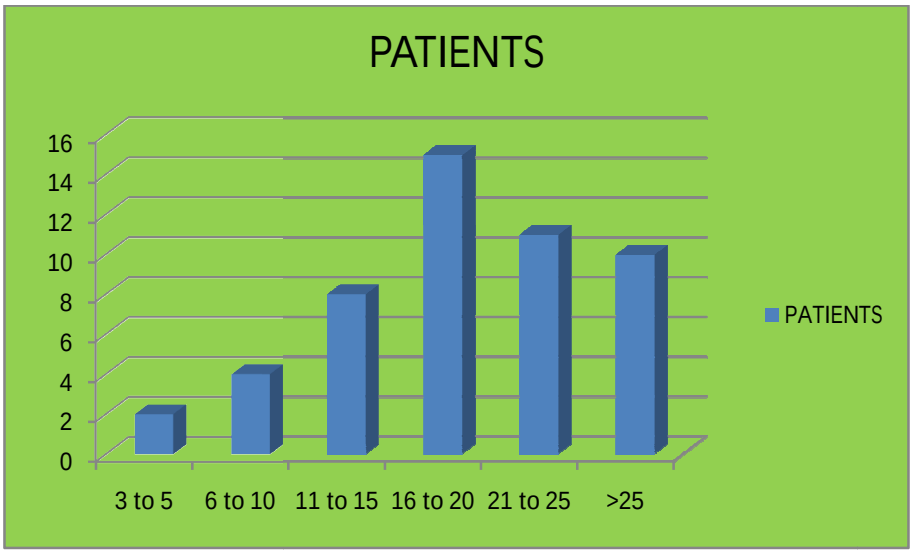
Out of 50 patients, 4 patients who did not come for follow up were excluded from the study .The rest of the patients 46 in number were regularly followed up the results were compared and analysed using chi square testing.

AGE DISTRIBUTION

TABLE NO 1:AGE DISTRIBUTION AMONG PATIENTS

Age in years	Patients
3to5	2(4%)
6 to10	4(8%)
11 to 15	8(16%)
16 to 20	15(30%)
21to 25	11(22%)
>25	10(20%)
Total	50

Figure No 7 - Bar Chart Showing Age Distribution

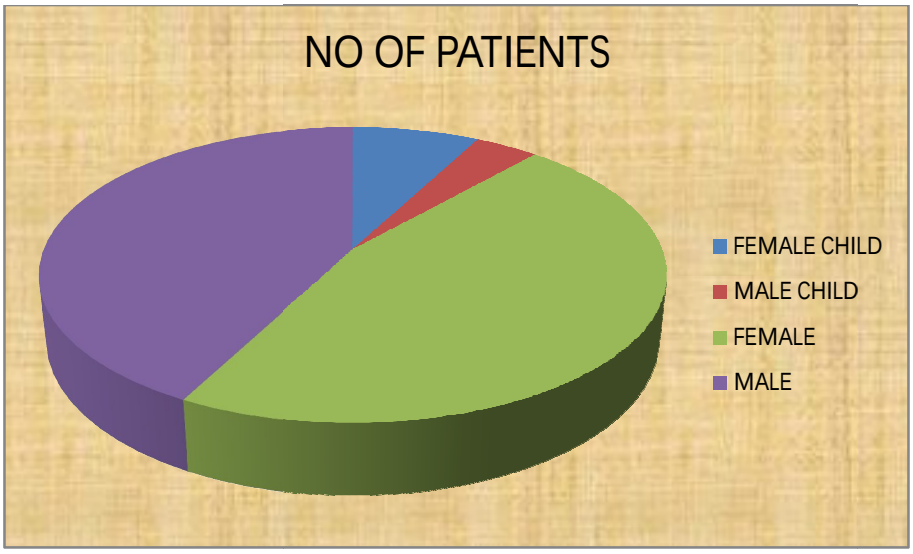


It is seen that majority of patients were in the age group 16-20 (30%)The next majority age group was 21-25 years (22%)

Table No 2 Gender Distributions of Patients

Sex	Patients
Female child	4(8%)
Male child	2(4%)
Female	24(48%)
Male	22(44%)

Figure No 8- Pie Chart Showing Sex Of The Patients



The total number of females were 24(48%).the total number of males were 22(44%) the total number of female child is 4(8%).the total number of male child is 2(4%)

Table No 3 Comparison of Duration of Surgery In Minutes

SURGERY	COBLATION	CONVENTIONAL	T value	P value
DURATION min	16.4	11.8	9.286	> 0.05

Table No 4 Mean, Standard Deviation and Standard Error

(Duration of Surgery)

DS in Min	N	Mean	Std. Deviation	Std. Error Mean
CONVENTIONAL	50	11.18	3.655	.475
COBLATION	50	16.40	4.661	.659

Figure No 9 Bar Chart Showing Duration of Surgery in Minutes

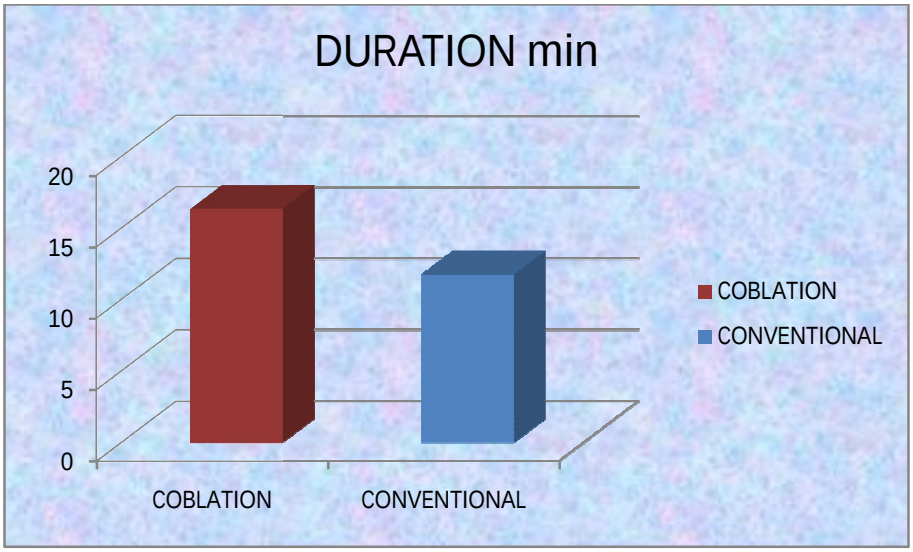


Table No 5 Independent T Test (Duration Of Surgery)

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	13.589	.05	-12.286	98	.000	-9.320	.759	-10.825	-7.815
Equal variances not assumed			-12.286	77.768	.000	-9.320	.759	-10.830	-7.810

The mean duration is measured from giving incision over the tonsil upto achieving complete hemostasis ,for coblation tonsillectomy the mean duration was 16 minutes and 4seconds and for conventional tonsillectomy mean duration was 11 minutes and 8 seconds thus it took an average of 4 minutes 6 seconds to perform coblation procedure compared to conventional technique and this difference is no statistical significance T value is 9.286(p value >0.05)

Table No 6– Comparison of Intra Operative Blood Loss in Milli Litres

SURGERY	COBLATION	CONVENTIONAL	T value	P value
IOP BLOOD LOSS ml	18.74	43.44	-14.247	0.001

Table No 7-Mean Standard Deviation Standard Error Mean (Intra Operative Blood Loss)

IOP blood loss	N	Mean	Std. Deviation	Std. Error Mean
CONVENTIONAL	50	44.02	9.384	1.341
COBLATION	50	18.74	6.868	.971

Figure No10- Bar Chart Showing Intra Operative Blood Loss

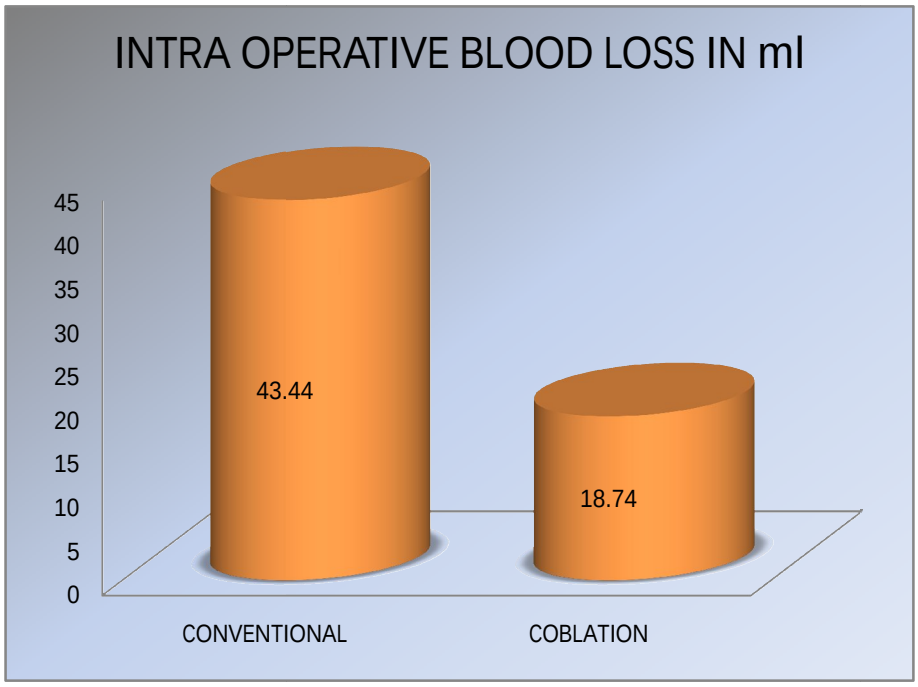


Table No 8-Independent T Test (Intra Operative Blood Loss)

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
VAR00017	Equal variances assumed	8.979	.003	15.318	97	.000	25.280	1.650	22.005	28.556
	Equal variances not assumed			15.270	87.898	.000	25.280	1.656	21.990	28.570

The amount of intra operative blood loss on an average in coblation method is approximately 19 ml and the amount of intra operative blood loss in conventional is 43 ml. The difference was (t value -14.247 p value(0.001)) statistically significant.

Table 9 Comparison of Post Operative Pain in First, Second and Seventh Post Operative Days

POSTOPERATIVE DAY PAIN SCALE	COBLATION	CONVENTIONAL	T value	P value
1st pod	4	8	-16.528	0.001
2nd pod	4	6	-14.392	0.001
7thpod	3	4	-3.11	0.002

Table No 10 Mean Standard Deviation Standard Error Mean (1st Post Operative Day Pain)

1st Post operative pain VAS scale	N	Mean	Std. Deviation	Std. Error Mean
CONVENTIONAL	50	7.42	1.180	.167
COBLATION	50	3.92	.922	.130

Table No 11 - Independent T Test

(1st Post Operative Day Pain)

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	3.326	.071	16.528	98	.000	3.500	.212	3.080	3.920
Equal variances not assumed			16.528	92.611	.000	3.500	.212	3.079	3.921

Table No 12 Mean Standard Deviation Standard Error Mean

(2nd Post Operative Day Pain)

2nd Post operative pain VAS scale	N	Mean	Std. Deviation	Std. Error Mean
CONVENTIONAL	50	6.2000	.96890	.13702
COBLATION	50	3.6400	.80204	.11343

Table No 13 Independent T Test (2nd Post Operative Day Pain)

	Levene's Test for Equality of Variances		t-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	.541	.464	14.392	98	.000	2.56000	.17788	2.20701	2.91299
Equal variances not assumed			14.392	94.696	.000	2.56000	.17788	2.20685	2.91315

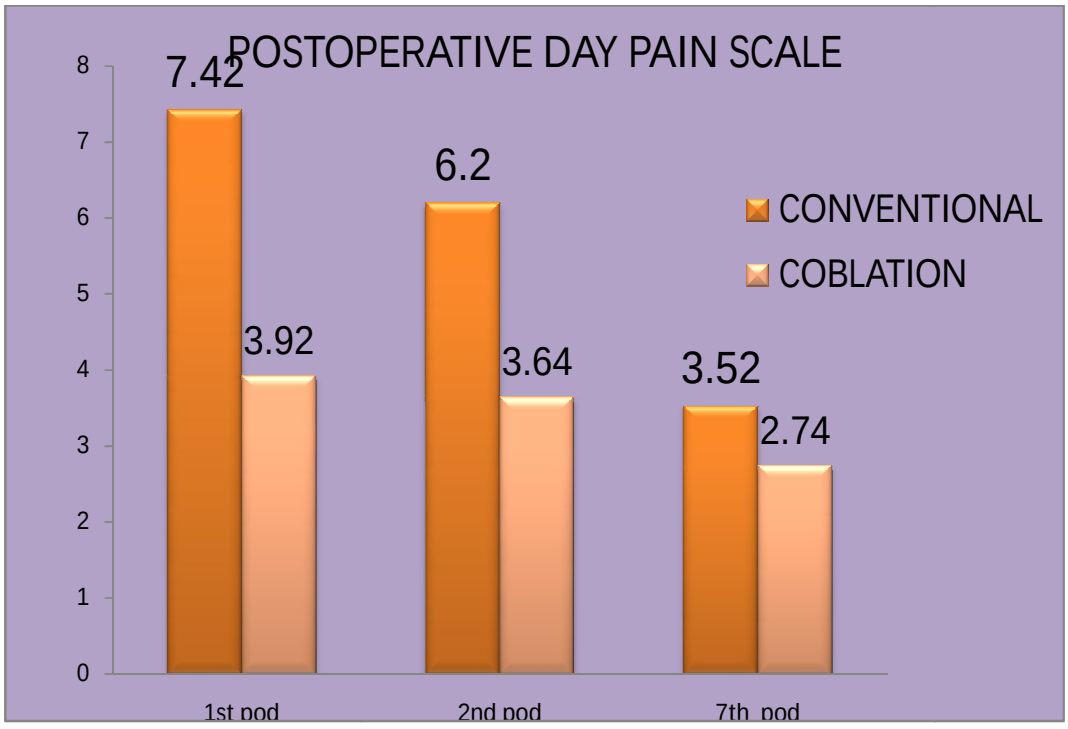
Table No 14 Mean Standard Deviation Standard Error Mean

(7th Post Operative Day Pain)

7th Post operative pain VAS scale	N	Mean	Std. Deviation	Std. Error Mean
CONVENTIONAL	46	3.8261	.70881	.10451
COBLATION	46	2.9783	.99976	.14741

Levene's Test for Equality of Variances		t-test for Equality of Means						
F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
3.661	.059	4.692	90	.000	.84783	.18070	.48884	1.20681
		4.692	81.114	.000	.84783	.18070	.48831	1.20734

Figure No 11- Bar Chart Showing Comparison of Post Operative Pain in First, Second and Seventh Post Operative Days



Sixty to Seventy percent of patients said that the side they underwent coblation was less painful in overall, than the other side on which conventional was used .Other thirty percent said that conventional side was less painful and

this was statistically significant. Pain was measured by VAS scale. Under this scale the mean pain averaged over 7days was 3.44 with coblation and 6 for conventional method.

Table 15-Comparison of Tonsillar Fossa Healing on First, Second And Seventh Postoperative Day

Post operative day healing	Coblation (%)	Conventional (%)	Chi square	P value
1st POD	81	40	35.17	0.0001
2nd POD	77.2	47.1	19.10	0.0001
7th POD	48.5	18.9	20.05	0.0001

Table No 16 Mean Standard Deviation Standard Error Mean (1st Post Operative Day Tonsillar fossa Healing)

1st POD Tonsillar fossa healing	N	Mean	Std. Deviation	Std. Error Mean
CONVENTIONAL	50	39.8000	7.88696	1.11538
COBLATION	50	80.3000	7.02837	.99396

Table 17 Independent T Test

(1st Post Operative Day Tonsillar fossa Healing)

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	1.459	.230	-27.108	98	.000	-40.50000	1.49400	-43.46480	-37.53520
Equal variances not assumed			-27.108	96.726	.000	-40.50000	1.49400	-43.46529	-37.53471

Table No 18 Mean Standard Deviation Standard Error Mean

(2nd Postoperative Day Tonsillar fossa Healing)

2nd POD Tonsillar fossa healing	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
CONVENTIONAL	50	47.2000	5.16661	.73067
COBLATION	50	73.6000	20.70295	2.92784

Table No 19 Independent T Test

(2nd Post Operative Day Tonsillar fossa Healing)

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	43.318	.000	-8.749	98	.000	-26.40000	3.01764	-32.38840	-20.41160
Equal variances not assumed			-8.749	55.080	.000	-26.40000	3.01764	-32.44728	-20.35272

Table 20-mean standard deviation standard error mean

(7th post operative day Tonsillar fossa healing)

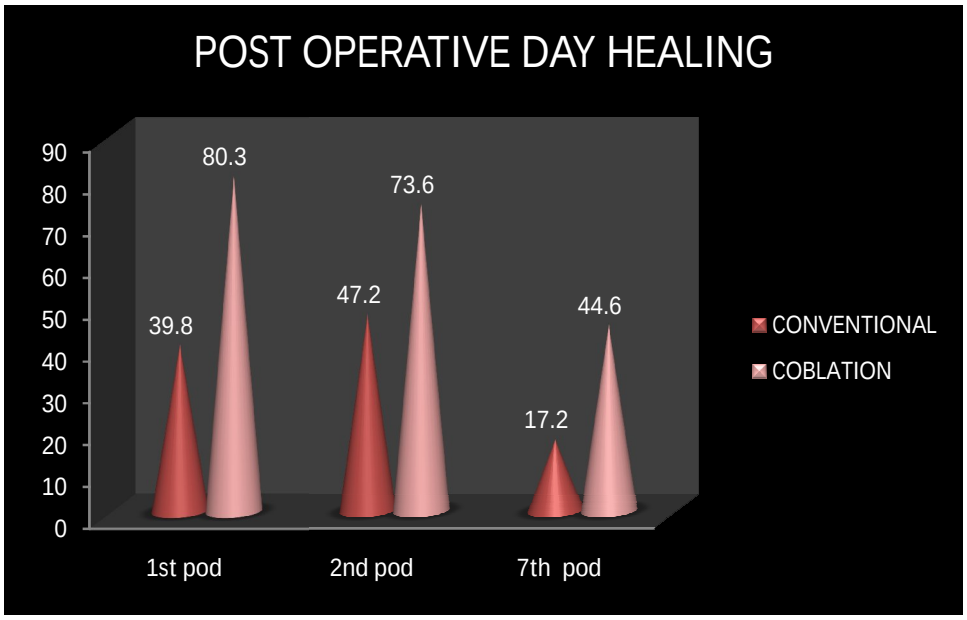
7th POD Tonsillar fossa healing	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
CONVENTIONAL	46	18.6957	8.72001	1.28570
COBLATION	46	48.4783	7.52991	1.11022

Table No 21 Independent T Test

(7th Post Operative Day Tonsillar fossa Healing)

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	3.674	.058	-17.532	90	.000	-29.78261	1.69871	-33.15739	-26.40783
Equal variances not assumed			-17.532	88.129	.000	-29.78261	1.69871	-33.15837	-26.40685

Figure No 12- Bar Chart Showing Comparison of Post Operative Day Tonsillar Fossa Healing on First, Second and Seventh Postoperative Day



Each tonsillar fossa was assessed for healing in terms of percentage of tonsillar fossa that was covered with slough slough formation was early in coblation side and reminded for long duration of time the percentage of slough formation in tonsillar fossa was 80,%74 %and 45% respectively in 1st ,2nd and 7th post operative days whereas in conventional method it was 40% 47% and 17%

POST OPERATIVE BLEEDING

There was no case of reactionary or secondary hemorrhage in both coblation and conventional method .

DISCUSSION

Tonsillectomy is a very common surgery done worldwide by any ENT surgeon. Among various techniques available for tonsillectomy, dissection and snare method is still preferred by most ENT surgeons. The main aim of this study is to compare the efficacy of coblation method with conventional tonsillectomy in the same patient.

PATIENTS PROFILE

AGE

In our study it is found that 30% of patients in age group 16-20 which was the predominant one, similar age distribution was adapted in studies conducted by Paramasivam V K[66] et al(2012),Fried man [67]et al 2004

GENDER

Almost equal male to female distribution was found in study most studies did not show much influence of gender .

DURATION OF SURGERY

In our study the mean duration of surgery for coblation method is 16.4 min (ranging from 11min to 25min) the mean duration of surgery for conventional method is 11.8min(ranging from 7 to 18min) Omrani et al(2012) [68] described the duration of surgery in their studies showed evidence that coblation method had less duration compared to conventional method. Singh

Rakesh et al(2012) [69] described similar studies and found coblation has longer duration .In our study coblation method takes longer duration . The p value is >0.05 and it is not statistically significant.

INTRA OPERATIVE BLOOD LOSS

The mean Intraoperative blood loss in conventional method was 43.44ml ranging from 15 to 60ml and for coblation method was 18.74ml ranging from 10 to 50ml.

Paramasivam VK [70] et al [2012] described conventional tonsillectomy associated with greater blood loss. Vangelin.G [71]et al [2013] a meta analysis report showed intra operative bleeding was significantly less in coblation.

Hong SM et al[72] [2013] conducted a study in pediatrics patients undergoing tonsillectomy and demonstrated coblation tonsillectomy has lesser blood loss. Similar studies were done by Omran etal(2011) and Sukesh etal(2012) In our study we found that conventional(44.2ml) had more amount of blood loss compared to coblation(18.74ml) p value <0.001 statisticaly significant.

POST OPERATIVE PAIN

Initial studies on coblation showed a significant decrease in post operation pain scores comparing with conventional method . On other hand some studies reported no significant reduction in pain with coblation surgery. Nastasha Polites et al [73] (2006) described coblation tonsillectomy was

significantly less painful and also found coblation method caused less pain in first 3 post operative days.

Timms MS [74] et al suggested significant benefit in post operative pain levels in coblation method. In our study we found pain was significantly less on 1, 2, & 7th POD. Pain in coblation method and the p value was<0.001,<0.001,<0.002 respectively and statistically the pain was significantly less.

POST OPERATIVE TONSILLAR FOSSA HEALING

The tonsillar fossa healing was delayed on Coblation method by presence of slough in the fossa on 1st , 2nd and 7th post operative day .Coblation causes early slough formation and delayed healing.

Temple RH et al[75] described coblation has advantages in post operative period & rapid return to normal diet.

POST OPERATIVE HEMORRHAGE

Noon et al [76] described significantly higher hemorrhage rate in coblation comparing with diathermy. Divi V et al [77] in a retrospective study found no statistical difference between hemorrhage rates for coblation versus non-coblation tonsillectomy techniques. In our study there was no reactionary or secondary hemorrhage in any patient .

SUMMARY

In our study the predominant age group was found to be 16-20 years . There was no significant difference in the incidence among age distribution and gender and it does not seem to significantly affect the study outcome.

The duration of surgery in coblation method was compared with conventional method.It was 11.8 minutes in conventional and 16.4 minutes in coblation. The intraoperative blood loss was compared in both methods. In coblation method it was 18.74 ml and in conventional method it was 43.44 ml so obviously 20-25 ml of intra operative blood loss was minimized in coblation method.

The post operative pain which was measured using VAS scale was compared in both methods on first,second and seventh post operative days for coblation the mean post operative pain scores was 3.92,3.64 and 2.74 respectively whereas in conventional method 7.42,6.20 and 3.52 so about 60-70% patients had lesser pain in coblation side compared to the conventional side

The post operative tonsillar fossa healing was estimated by the amount of slough covered in tonsillar fossa and it was compared on first,second and seventh post operative days. In coblation side mean area of slough covered was 80%,74% and 4.5% respectively and on conventional side it was 40%, 47% and 18% respectively. So slough formation is more in coblation side compared to conventional side so the healing was delayed.

There was no primary or secondary hemorrhage in our study. These results were analysed and compared using chi-square testing and it was found to be statistically significant.

CONCLUSION

This study was conducted in the Department of Otorhinolaryngology, Coimbatore Medical College Hospital to compare the efficacy of coblation and conventional tonsillectomy in same patient.

This study comprised of 50 patients with chronic tonsillitis who were above 3 years without adenoid hypertrophy. In half of the patients , right side tonsil was removed by coblation method and left tonsil was removed by conventional method and in the other half , right side tonsil was removed by conventional method and left tonsil removed by coblation method. The patients were examined regularly on first second and seventh post operative days.

From our prospective study we reach the following conclusions

1. Coblation tonsillectomy is relatively easy technique to perform providing a near bloodless field and minimal surrounding tissue damage.
2. The operative time required to perform coblation tonsillectomy was more than the conventional method. The longer time did not cause more intra operative blood loss and post operative pain.
3. The intra operative blood loss was significantly less on the coblation side than on the dissection side.
4. Most importantly, postoperative pain scores were significantly lower on the coblation side on the first, second and seventh post operative days . It helps the patients to resume their normal activities early .

5. Healing was slightly delayed on the coblation side .

To conclude, coblation tonsillectomy is easy to perform and it is safer with significant advantages in terms of decrease in intra operative blood loss and postoperative morbidity. But the only deterring factor in the regular usage of coblation is the cost factor which has to be overcome.

BIBLIOGRAPHY

1. Mohammadreza Omrani, et al Coblation versus traditional tonsillectomy: A double blind randomized controlled trial 2012; 17(1): 45-50

2. Singh Rakesh et al A Prospective, Randomized, Double-Blind Study of Coblation versus Dissection Tonsillectomy in Adult Patients Indian Journal Otolaryngology , Head and Neck Surgery (July–September 2012) 64(3):290–294

3. Dempster JH Post-tonsillectomy analgesia: the use of benzocaine lozenges. Journal Laryngology, Otology 1988 102:813–814

4. Baily BJ Tonsils and adenoids: snapshots from the laryngoscope scrapbook. Laryngoscope 1997 107:301–306

5. Philpott, C.M.et al, A double-blinded randomized controlled trial of coblation versus conventional dissection tonsillectomy on postoperative symptoms Clinical. Otolaryngology. 2005, 30, 143–148

6.Friedman M, et al Radiofrequency tonsil reduction: safety, morbidity, and efficacy. Laryngoscope 2003 113:882–887

7. Curtin JM: The history of tonsil and adenoid surgery. Otolaryngology Clinics North America 1987; 20:415

8. Catlin FI et al: Pulmonary complications of tonsillectomy described by . Laryngoscope 1981; 91:52.

9. Weir N: Otolaryngology: an Illustrated History. London, Butterworth & Co, 1990.15-17

10.Crowe et al Relation of tonsillar and naso pharyngeal infection to general systemic disorders. Bull Johns Hopkins Hosp 1917; 28:1.

11. Datta PG et al Congenital absence of one tonsil without any other congenital abnormality: a rare presentation. 2012 Apr;38(1):39-40

12.Shambaugh Jr GE: Surgery of the Ear. 2nd ed. Philadelphia, WB Saunders, 1967. 1

13. In: Langman J, ed. Medical Embryology, 4th ed. 1981 272.

14. Anson BJ, Donaldson JA: Surgical Anatomy of the Temporal Bone and Ear. 2nd ed. Philadelphia 1973;78

15. Lim CM et al Transoral anatomy of the tonsillar fossa and lateral pharyngeal wall: Anatomic dissection with radiographic and clinical correlation laryngoscope 2013 Sep 19 137.

16. Siegel G: The influence of tonsillectomy on cell mediated immune response. Arch Otolaryngology Head Neck Surgery 1984; 239:205.

17. Hollinshead WH et al The pharynx and larynx. The Head and Neck, Philadelphia 1982 89.

18. Goeringer GC et al, The embryogenesis and anatomy of Waldeyer's ring. Otolaryngology Clinics North America 1987; 20:207

19. Richtsmeier WJ et al The physiology and immunology of the pharyngeal lymphoid tissue. Otolaryngology Clinics North America 1987; 20:219-228

20. Brandtzaeg P et al: Immunoglobulin systems of human tonsils I: control subjects of various ages: quantification of Ig-producing cells, tonsillar morphometry and serum Ig concentration. 1978; 31:367-381

21Surjan L et al Immunoglobulin system of human tonsil II: patients with chronic tonsillitis or tonsillar hyperplasia: quantification of Ig-producing cells, tonsillar morphometry and serum Ig concentrations. 1978; 31:382..

22. Siegel G: Theoretical and clinical aspects of the tonsillar function. International Journal Pediatric Otorhinolaryngology 1983; 6:61

23. Micheal gleason George G Browning Martin J Burton Scott Brown Otolaryngology Head and Neck surgery 6th edition volume 11997 1:10;25

24. Brodsky L, Koch RJ: Bacteriology and immunology of normal and diseased adenoids in children. Arch Otolaryngology Head Neck Surgery 1993; 119:821.

25. Brook I, Yocum P: In vitro protection of group A beta hemolytic streptococci from penicillin and cephalothin byBacteroidesfragilis. Chemotherapy 1983; 29:18.

26. Petersdorf RG, ed. Harrison's Principles of Internal Medicine, 10th ed. New York: McGraw-Hill; 1983 1267-69

27. Zalzal GH et al Pharyngitis and adenotonsillar disease St. Louis: Mosby; 1986 89-97

28. Dobie RA, Robey DN: Clinical features ofdiphtheria in the respiratory tract. JAMA 1979.47

29. Teele DW et al: Inflammatory disease of the mouth and pharynx. In: Bluestone CD ed. Pediatric Otolaryngology,1983.1345

30. Shapiro NL et al Streptococcal pharyngitis in children. Otolaryngology Head Neck Surgery 1995.23-24

31. Krober MS et al: Streptococcal pharyngitis: placebo-controlled double-blind evaluation of clinical response to penicillin therapy. JAMA 1985 67

32. Sugita R, et al: Microorganisms isolated from peritonsillar abscess and indicated chemotherapy. Arch Otolaryngology Head Neck Surgery 1982.53

33. Yellon RF et al Head and neck space infections in children. . Pediatric Otolaryngology, 3rd ed. 589

34. Ta n PT, Chang LY, Huang YC, Chiu C H, Wang CR, Li n TY. Deep neck infection in children . Journal of Microbiology, Immunology, and Infection. 2001 ; 34:287-92

35. Christensen PH et al: Unilateral immediate tonsillectomy as the treatment of peritonsillar abscesses: results with special attention to pharyngitis. Journal Laryngology Otology 1983.87

36. Alexandria et al american academy of otolaryngology head and neck surgery 1995 94

37. . Paradise J L, Bluestone CD, et al 2001. Efficacy of tonsillectomy for recurrent throat infection in severely affected children. 113-27

38. Bailey, Byron J. Title: Head & Neck Surgery - Otolaryngology, 4th Edition volume 2 1188

39.Micheal gleason, George G Browning,Martin J Burton Scott brown's Otorhinolaryngology,Head and neck surgery,7th edition 2008 volume 2 ;1998 47

40. Ali NJ, Pitson D et al: Sleep-disordered breathing: effects of adenotonsillectomy on behavior and psychological functioning. 1996;.34

41. Bolger WE et al: Preoperative hemostatic assessment of the adenotonsillectomy patient. Otolaryngology Head Neck Surgery 1990; 103:396.

42. Pinder D et al . Dissection versus diathermy

Cochrane Database o f Systematic Reviews. Parker,45

43. Alexiou et al Modern technology-assisted vs conventional tonsillectomy: a meta-analysis of randomized controlled trials 2011 Jun;137(6):558-70.

44.Bergler W et al Tonsillectomy with argon plasma coagulation (APC) . evalu ation of pain and haemorrhage. Laryngoscope. 2001 ;39

45 Krespi YP, Ling EH. Laser assisted serial tonsillectomy.

: Journal of Otolaryngology. 1994 98

46. Koltai PJ,et al . Intracapsular partial tonsillectomy for tonsillar hypertrophy in children Laryngoscope. 2002 ; 1 1 2 : 1 7-9

47. Wire klint et al Health-related quality of life after tonsillotomy versus tonsillectomy in young adults: 6 years postsurgery follow-up. 2012 Aug;269(8):1951-8

48.P L Dhingra disease of Ear Nose and Throat 5th edition 2011 382

49. Philpott, C.M.et al, A double-blinded randomized controlled trial of coblation

versus conventional dissection tonsillectomy on postoperative symptoms

Clinical. Otolaryngology. 2005, 30, 143–148

50. Burton MJ,et al Coblation versus other surgical techniques for tonsillectomy. Cochrane Database Systematic Review 2007; (3): CD004619

51. Nelson LM.et al Radiofrequency treatment of obstructive tonsillar hypertrophy. Archives of Otolaryngology Head and Neck Surgery. 2000; 1 26 : 73 6-40

52. Bameshki AR et al The Effect of Local Injection of Epinephrine and Bupivacaine on Post-Tonsillectomy Pain and Bleeding. 2013 Sep;25(73):209-214

53. Fernnandez et alAnesthesia in children for tonsillectomy by dissection in the Rose position 1968 Apr;15(2):234-7

54Schmidt R, Herzog A, Cook S, et al: Complications of tonsillectomy: a comparison of techniques. Archives Otolaryngology Head Neck Surgery 2007; 133:925-928

55.Rosen D et al Parental perceptions of sleep disturbances and sleep-disordered breathing in children with Down syndrome. 2011 Feb;50(2):121

56. Wake M, Glossop P. Guillotine and dissection tonsillectomy compared. Journal of Laryngology and Otology. 1 989 ; 1 03 : 588-9 1

57. Derkay CS, et al: Post-tonsillectomy morbidity and quality of life in pediatric patients with obstructive tonsils and adenoid: Microdebrider vs electrocautery. Otolaryngology Head Neck Surgery 2006; 143:114-120..

58. Zarnetzki et al How to make tonsillectomy a safer procedure: the anaesthetist's view.2013;75(3):144-51

59. Younis RT, Hesse SV, Anan d VK. Evalu ation a n d utility and cost effectiveness of obtaining histopathologic diagnosis on all routine tonsillectomy specimens. Laryngoscope.2001 ; 11 1 : 2 1 66-9.

60.Hall MD et al: The effect post-operative diet on recovery in the first twelve hours after tonsillectomy and adenoidectomy. Int J Pediatr Otorhinolaryngology 1995; 31:215.

61. Salonen A et al Recovery after tonsillectomy in adults: a three week follow-up study. Laryngoscope. 2002 ; 1 1 2 : 94-8.

62. . F. Javed et al, A completed audit cycle on post-tonsillectomy haemorrhage rate:Coblation versus standard tonsillectomy , 2007; 127: 300_304

63. N Polites et al Post operative pain following coblation tonsillectomy randomized control trail . 2006; 76: 226–229

64. Ozkris et al Comparison of two different adenoidectomy techniques with special emphasize on postoperative nasal mucociliary clearance rates: coblation technique vs. cold curettage 2012 Sep;22(9):579-81.

65. . N Polites et al Post operative pain following coblation tonsillectomy randomized control trail . 2006; 76: 226–229

66. Paramasivam et al Randomised comparative study of adenotonsillectomy conventional and coblation method for children with obstructive sleep apnoea. 2012 Jun;76(6):816-21.

67.Fried man et al retrospective study intra capsular tonsil coblation with uvulo palatoplasty 2004 2-3

68. Mohammadreza Omrani,et al Coblation versus traditional tonsillectomy: A double blind randomized controlled trial J Res Med Sci 2012; 17(1): 45-50

69. Singh Rakesh et al A Prospective, Randomized, Double-Blind Study of Coblation versus Dissection Tonsillectomy in Adult Patients Indian Journal Otolaryngology Head Neck Surgery (July–September 2012) 64(3):290–296

70. Paramasivam V K et al Randomised comparative study of adenotonsillectomy by conventional and coblation method for children with obstructive sleep apnoea. 2012 Jun;76(6):816-21.

71. Vangelin G et al Meta analysis of intra operative blood loss in various methods of tonsillectomy 2012 12-14

72. Hong S M et al Coblation tonsillectomy in paediatric patients 2013 22-28

73. . N Polites et al Post operative pain following coblation tonsillectomy randomized control trail 2006; 76: 226–229

74. Timms MS, et al Coblation tonsillectomy: a double blind randomized controlled study. 2003 Sep;117(9):704-6

75. Temple RH et al Paediatric coblation tonsillectomy. 2002 Jun;116(6):450 26

76. Noon AP et al Increased post-operative haemorrhage

seen in adult coblation tonsillectomy. Journal Laryngology Otology 2003 117:704–706

77. Divi V, Benninger M et al Postoperative tonsillectomy bleed: coblation versus non-coblation. Laryngoscope 2005 115:31–33

PROFORMA

NAME :

AGE :

SEX :

OCCUPATION :

ADDRESS :

SOCIOECONOMIC STATUS :

HOSPITAL OP/IP NUMBER :

PRESENTING COMPLAINTS :

1.THROAT PAIN: ONSET

DURATION

AGGRAVATING / RELIEVING

FACTORS

2. NASAL OBSTRUCTION ONSET

DURATION

AGGRAVATING/RELIEVING

FACTORS

3.DIFFICULTY IN

SWALLOWING: ONSET

DURATION

AGGRAVATING / RELIEVING

FACTORS

4. MOUTH BREATHING/ SNORING

ONSET

DURATION

5. HALITHOSIS:

DURATION

ONSET

6. ASSOCIATED SYMPTOMS

EAR BLOCK

CHANGE IN VOICE

RECURRENT ATTACKS OF UPPER RESPIRATORY TRACT INFECTIONS

PAST HISTORY

- ALLERGY
- ASTHMA
- PREVIOUS THROAT SURGERY
- IRRADIATION
- HYPERTENSION
- DIABETES
- PULMONARY TB

PERSONAL HISTORY

- SMOKING
- ALCOHOLISM
- DIET
- BOWEL AND BLADDER HABITS

FAMILY HISTORY

NIL RELAVANT

SOCIO ECONOMIC HISTORY

GENERAL EXAMINATION

TEMPERATURE

PULSE

BLOOD PRESSURE

PALLOR

ICTERUS

CLUBBING

CYANOSIS

EDEMA

GENERALISED LYMPHADENOPATHY

SYSTEMIC EXAMINATION

- CARDIOVASCULAR SYSTEM
- RESPIRATORY SYSTEM
- CENTRAL NERVOUS SYSTEM
- GASTROINTESTINAL SYSTEM

LOCAL EXAMINATION

EXAMINATION OF THROAT : 1. TONSILS AND PILLAR

(a) TONSILS

PRESENCE

SIZE

SYMMETRY

CRYPTS

MEMBRANE

ULCER

MASS

BULGE

(b) PILLARS.

CONGESTION

2. SOFT PALATE.

3. POSTERIOR PHARYNGEAL WALL

4. BASE OF TONGUE AND VALLECULLA

EXAMINATION OF NECK

JUGULO DIGASTRIC NODE ENLARGEMENT

EXAMINATION OF NOSE

- ANTERIOR RHINOSCOPY
- POST NASAL EXAMINATION

EXAMINATION OF EAR

INVESTIGATIONS

GENERAL INVESTIGATIONS

Complete hemogram

Renal function tests

Urine Routine Examination

Random blood sugar

Chest XRay

ECG

SPECIFIC INVESTIGATIONS

Pure Tone Audiometry

Impedence Audiometry

Video otoscopy

Diagnostic Nasal Endoscopy

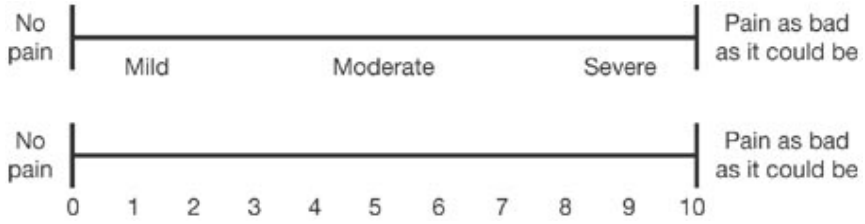
X Ray of Nasopharynx lateral view for adenoid

CT Scan of paranasal sinuses (in selected cases)

FOLLOW UP EXAMINATION

	1ST POD	**2ND POD**	**7TH POD**
POST OPERATIVE PAIN			
POST OPERATIVE HEALING			

THE VISUAL ANALOGUE SCALE



Patient asked to put a mark in the line based on the severity of pain.

CONSENT FORM

Yourself Mr./Mrs./Ms…….. are being asked to a participant in the research study titled " PROSPECTIVE COMPARATIVE STUDY OF COBLATION VERSUS CONVENTIONAL TONSILLECTOMY " in CMC Hospital, Coimbatore, conducted by Dr.SATHISH.R, Post Graduate Student, Department of ENT, Coimbatore Medical College. You are eligible after looking into the inclusion criteria. You can ask any question you may have before agreeing to participate.

Research Being Done

PROSPECTIVE COMPARATIVE STUDY OF COBLATION VERSUS CONVENTIONAL TONSILLECTOMY

Purpose of Research

1.Primary objective:compare the efficacy of coblation & conventional tonsillectomy in same patient

2.Secondary objective:compare morbidity & complications associated with these procedures by each method in same patient

Procedures involved

50 patients admitted in ENT Department of Coimbatore Medical college Hospital , who are >3yrs of age with chronic tonsillitis are selected randomly & one tonsil removed by coblation method & opposite tonsil by conventional method in same patient to see if there is any difference in (i)Duration of surgical procedure (ii)Intra operative blood loss (iii)Post operative blood loss (iv)Post operative pain(v)Tonsillar fossa healing

Decline from Participation

You have the option to decline from participation in the study existing protocol for your condition.

Privacy and Confidentiality

Privacy of individuals will be respected and any information about you or provided by you during the study will be kept strictly confidential.

Authorization to publish Results

Results of the study may be published for scientific purposes and/or presented to scientific groups, however you will not be identified.

Statement of Consent

I volunteer and consent to participate in this study. I have read the consent or it has been read to me. The study has been fully explained to me, and I may ask questions at any time.

---------- ----------

Signature /Left thumb impression Date

(volunteer)

---------- ----------

Signature of witness Date

MASTER CHART

S No	Name	IP NO	Age	Sex	DS in Min		IOP blood loss		Post operative pain VAS scale						Tonsillar fossa healing %						PO BL
					C	CO	C	CO	C			CO			C			CO			
									1st	2nd	7th	1st	2nd	7th	1st	2nd	7th	1st	2nd	7th	
1	Vijayakumar	61116	27	Male	10	14	15	50	8	6	4	4	4	3	30	50	10	75	90	55	-
2	Kowsalya	68978	16	Female	15	18	55	20	7	8	3	3	3	2	35	45	20	70	85	50	-
3	Deepika	70015	18	Female	12	15	40	20	9	6	3	5	4	5	35	50	15	85	90	45	-
4	Soundariya	65452	4	FCH	15	20	45	15	8	7	4	4	4	2	40	55	20	80	90	50	-
5	Dorin	66950	19	Male	10	16	50	20	7	7	2	3	3	2	45	45	25	75	90	55	-
6	Praveenkumar	70032	26	Male	15	18	55	20	9	8	4	4	2	3	30	40	15	75	90	45	-
7	Md.hasim	70075	5	MCH	15	20	50	15	8	6	3	2	2	2	35	50	15	80	85	35	-
8	Vidhya	70975	17	Female	10	15	52	18	8	7	4	4	4	2	45	55	20	85	80	35	-
9	Karthikeyan	71001	22	Male	15	14	55	28	7	7	-	4	4	-	45	50	-	75	85	-	-
10	Md. Ajmal	67042	20	Male	10	20	45	20	9	8	3	3	6	2	35	45	15	80	80	40	-
11	Venkatesh	68634	25	Male	15	18	45	15	8	6	2	5	5	2	35	40	15	75	85	45	-
12	Meharaj	71645	28	Male	8	16	50	18	7	8	4	5	4	2	30	35	15	75	90	48	-
13	Tamil	68691	20	Male	7	15	55	15	7	7	4	4	4	2	35	40	10	80	85	40	-
14	Sujitha	68692	23	Female	10	17	50	15	6	7	3	3	3	3	40	40	25	85	85	50	-
15	Masika	71688	18	Female	15	16	40	15	6	6	4	5	4	2	40	50	25	90	80	10	-
16	Sugapriya	70252	28	Female	8	15	50	20	8	5	4	4	3	2	45	50	15	95	80	50	-
17	Aseenabegam	70299	19	Female	12	16	50	20	5	6	-	4	2	-	45	50	-	90	80	-	-
18	Ravikumar	71864	17	Male	15	18	50	20	8	6	4	3	4	3	45	50	10	95	90	50	-
19	Mahalakshmi	72647	7	FCH	10	20	55	25	9	5	3	3	3	2	30	40	20	80	85	55	-
20	Girija	71870	13	Female	8	14	40	25	8	5	4	3	4	2	35	45	30	85	80	50	-

21	Novfol	71934	15	Male	15	20	45	35	7	6	5	4	3	3	40	50	20	70	90	55	-
22	Gayathri	73292	23	Female	7	18	40	30	7	5	6	4	2	3	45	50	30	75	85	55	-
23	Santhya	73503	15	Female	10	18	50	30	5	5	4	3	4	4	55	50	30	80	80	45	-
24	Sasikumar	73553	15	Male	10	15	55	25	7	6	4	5	4	5	50	45	25	75	90	55	-
25	Aron Ebinesan	73555	27	Male	10	16	45	20	9	5	4	4	3	4	50	50	25	75	80	50	-
26	Ramya	45567	13	Female	8	17	40	15	7	6	4	3	3	3	55	50	10	80	10	55	-
27	Hemalatha	47081	24	Female	10	18	30	11	7	5	3	6	3	3	40	45	15	85	90	52	-
28	Dharun	48575	8	MCH	11	13	35	14	8	4	4	5	3	3	30	50	10	75	90	50	-
29	Affis	62317	19	Male	9	16	40	15	9	5	4	4	4	2	35	40	15	90	60	45	-
30	Thasin	62313	25	Male	11	18	40	11	7	6	4	2	4	3	55	50	15	95	10	50	-
31	Md. Ashim	51868	28	Male	10	14	40	12	8	6	4	3	4	3	35	55	10	85	60	50	-
32	Rinsy	53357	29	Female	12	15	35	15	6	6	4	5	3	4	45	55	10	75	60	50	-
33	Thavanesh	53373	15	Male	12	20	35	15	8	6	5	5	3	3	40	50	10	70	50	50	-
34	Anjali	53377	20	Female	13	18	35	10	5	5	4	3	3	3	35	45	15	80	50	50	-
35	Meena	54688	23	Female	9	18	35	13	9	6	-	5	4	-	30	40	-	85	55	-	-
36	Dhayasree	54687	10	FCH	10	16	30	15	7	6	4	4	4	3	30	35	15	75	35	50	-
37	Jothiprabha	64684	18	Female	9	20	40	14	8	6	4	4	4	3	55	50	15	80	35	50	-
38	Oviyasri	65222	24	Female	10	18	45	11	8	6	4	3	3	3	50	50	15	85	45	50	-
39	Rizwara	65276	9	FCH	11	18	55	15	5	6	4	3	4	3	55	50	10	90	80	50	-
40	Mythili	66722	19	Female	10	15	35	18	9	6	4	5	4	5	30	50	10	95	60	45	-
41	Ramyadevi	66782	21	Female	10	18	35	18	7	6	4	3	4	5	35	50	10	75	55	50	-
42	Ragukumar	54708	30	Male	8	14	30	20	8	6	4	4	4	5	45	40	20	70	45	50	-
43	Keerthana	56235	20	Female	9	13	30	20	8	6	4	3	5	4	35	40	10	80	70	50	-
44	Shiny	57869	15	Female	15	15	45	18	9	6	-	4	4	-	30	50	-	75	80	-	-

45	Janani	57903	23	Female	12	16	40	15	5	8	5	5	5	2	30	55	25	75	70	55	-
46	Brintha	68358	13	Female	18	15	50	20	6	7	4	5	4	3	35	50	30	80	80	50	-
47	Salman	68351	29	Male	15	13	15	18	7	6	3	4	4	2	40	45	30	80	90	55	-
48	Suriya	61080	24	Male	11	15	60	15	7	6	4	5	3	5	35	50	20	85	100	50	-
49	Jeevitha	61111	20	Female	10	12	60	20	8	8	3	3	4	2	45	45	40	70	90	55	-
50	Haseem	61095	30	Male	9	13	55	15	8	8	4	5	4	3	45	50	50	75	80	50	-

DESCRIPTIVE STATISTICS OF ALL OBTAINED DATA

	N	Minimum	Maximum	Mean	Std. Deviation
C(DS)	50	7.00	18.00	11.1800	2.65491
Co(DS)	50	14.00	20.00	16.4000	4.66095
(IOBL)c	50	15.00	60.00	43.4400	10.15424
(IOBL)co	50	10.00	50.00	18.7400	6.86847
(c)1ST PODP	50	5.00	9.00	7.4200	1.17959
(c)2ND PODP	50	4.00	8.00	6.2000	.96890
(c)7TH PODP	50	.00	6.00	3.5200	1.24933
(Co)1ST PODP	50	2.00	6.00	3.9200	.92229
(Co)2NDPODP	50	2.00	6.00	3.6400	.80204
(Co)7^{TH} PODP	50	.00	5.00	2.7400	1.25860
TFH(c)1ST POD	50	30.00	55.00	39.8000	7.88696
TFH(c)2ND POD	50	35.00	55.00	47.2000	5.16661
TFH(c)7THPOD	50	.00	50.00	17.2000	9.80212
TFH(co)1STPOD	50	70.00	95.00	80.3000	7.02837
TFH(co)2ND POD	50	10.00	100.00	73.6000	20.70295
TFH(co)7TH POD	50	.00	55.00	44.6000	15.11858
Valid N (listwise)	50				

KEY TO MASTER CHART AND DESCRIPTIVE STATISTICS

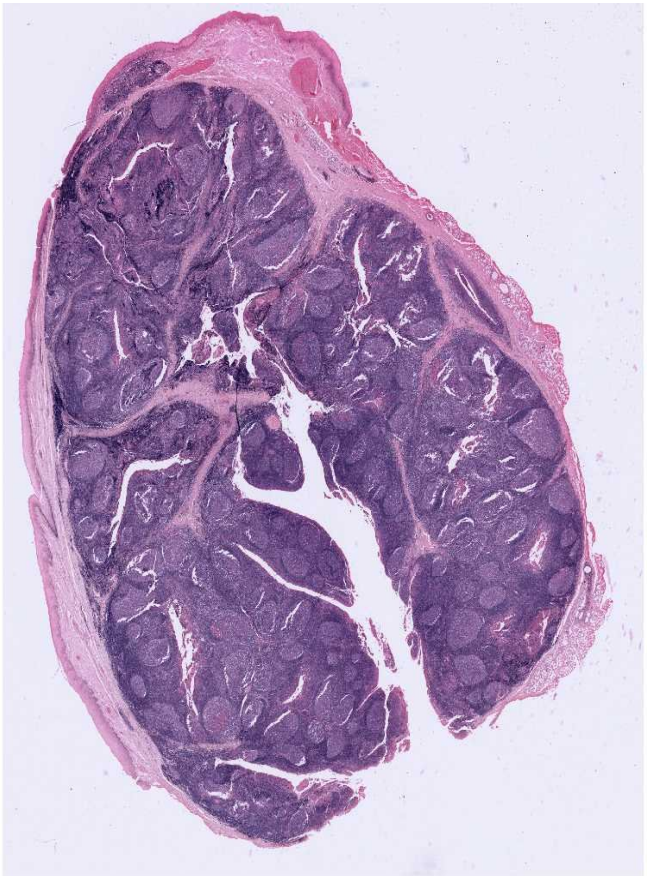
SL.NO	Serial Number
MCH	Male Child
FCH	Female Child
CO	Coblation Method
C	Conventional Method
DS	Duration Of Surgery
IOBL	Intra Operative Blood Loss
POD	Post Operative Day
PODP	Post Operative Day Pain
POBL	Post Operative Blood Loss
TFH	Tonsillar Fossa Healing

ABSTRACT

This prospective study was conducted to compare coblation tonsillectomy method with the conventional dissection method in terms of duration of surgery, intra operative blood loss, post operative pain, post operative bleeding, and post operative tonsillar fossa healing in chronic tonsillitis patients above 3 years of age undergoing tonsillectomy. Patients with adenoid hypertrophy and secretory otitis media were excluded from the study. Fifty patients undergoing tonsillectomy for chronic tonsillitis were randomized to have one tonsil removed by sub capsular coblation method and the other side by conventional dissection method. The duration of surgery and intra operative blood loss was measured for each side. Patients were evaluated on first, second and seventh postoperative day for postoperative pain (by visual analog scale), post operative bleeding, and tonsillar fossa healing. Statistical comparison was done using appropriate tests. The patients were demographically matched. It took longer to perform the coblation procedure (16.4vs 11.8 min) ($P>0.05$) .The intra operative blood loss on the coblation method was18.74 ml vs 43.44 ml on the conventional side ($P = 0.001$). 70%patients said that the coblation side was less painful for the seven days recovery period. There were significant differences seen on first, second and seventh post operative day pain scores respectively. The difference was significant. There was no case of reactionary or secondary hemorrhage in this study. The tonsillar fossa healing took

longer in the coblation method. Coblation Tonsillectomy is an easy to perform technique with a significantly reduced intra operative blood loss and post operative pain. Longer operative times may be further reduced with experience.

HISTOLOGY OF TONSIL

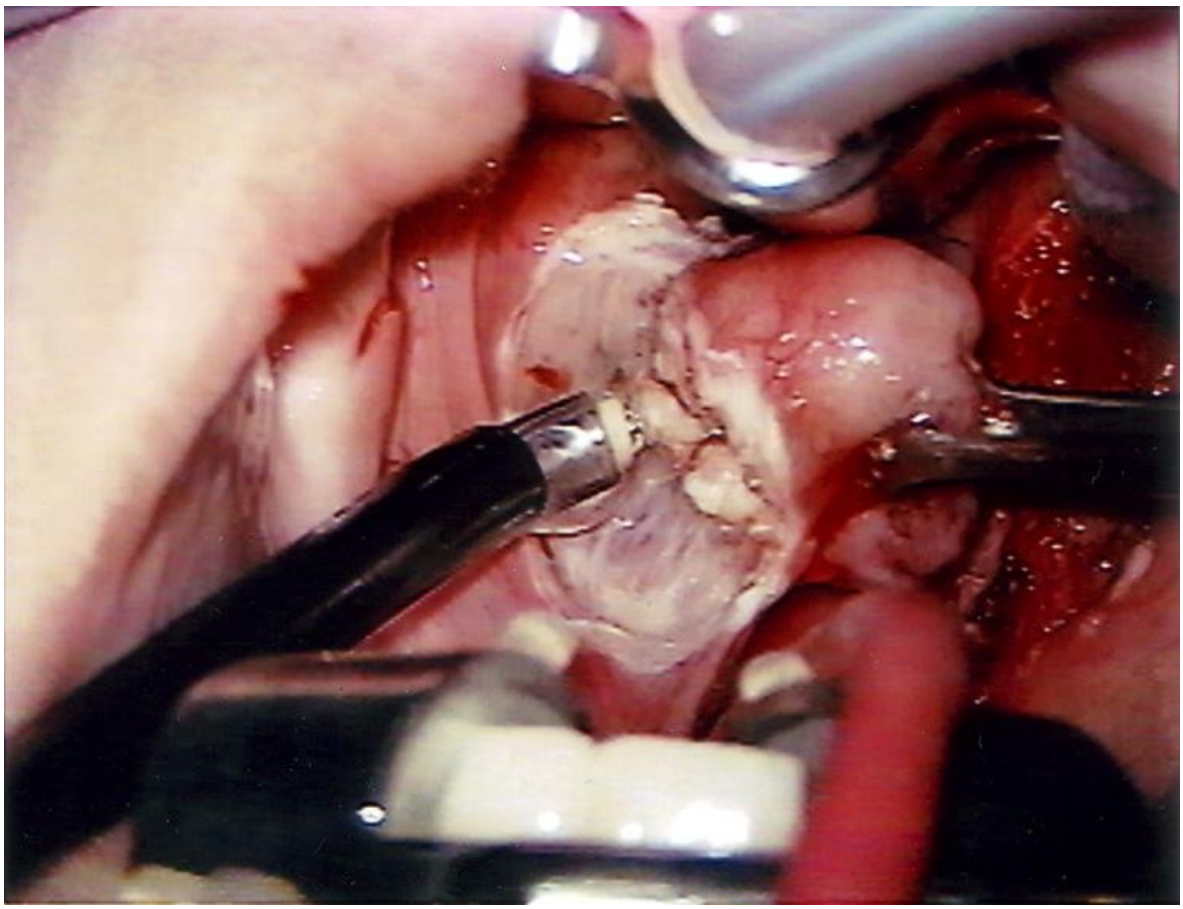


PICTURE SHOWING CHRONIC TONSILLITIS

ARTHOCARE EVAC 70 COBLATION WAND

COBLATION DEVICE

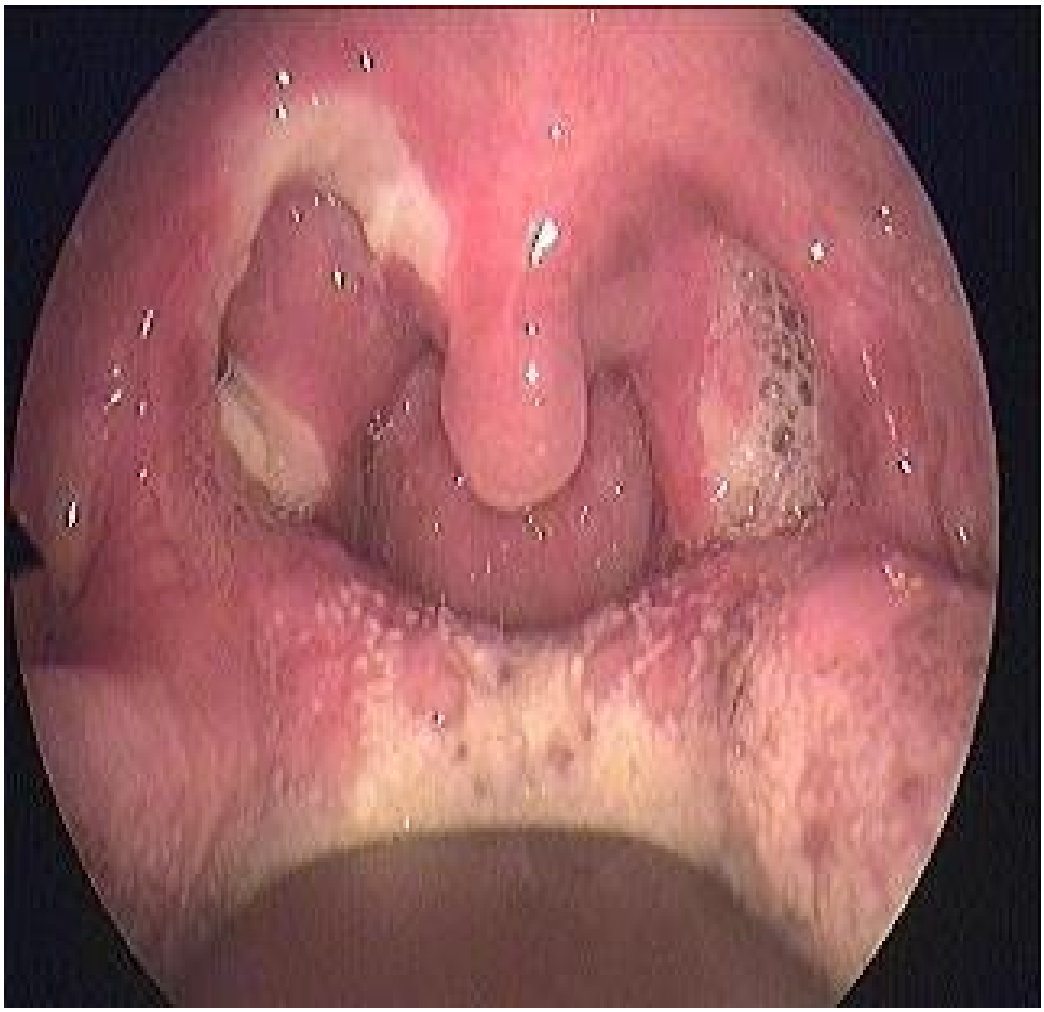
COBLATION TONSILLECTOMY



TONSILLAR FOSSA HEALING IN FIRST POST OPERATIVE DAY

TONSILLAR FOSSA HEALING IN SECOND POST OPERATIVE DAY

TONSILLAR FOSSA HEALING IN SEVENTH POST OPERATIVE DAY



CO2 LASER

HARMONIC SCALPEL